Divine Intervention Step 2 Podcasts Notes INFO DOC - Read Only File

Helpful Resources:

Official Errata

Submit errors here!

Podcast checklists with episode lengths

Divine's list of podcasts for Step 2 (grouped by specialty or "special topic")

YouTube advice on using DI Podcasts & Notes (per November 2020 changes)

How Divine Recommends to use his podcasts for Step 2CK and Shelf Exams

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Ep. 17: Peds Diseases of The Pediatric Population Part 1.

GI PROBLEMS IN KIDDOS

- 7 yo Asian male w/ chronic watery diarrhea + stool positive for reducing sugars + positive hydrogen breath test → lactose intolerance = lactase deficiency
    - Tx:
        - Infant: soy-based formula
        - Child: Avoid lactose
- 23 mo w/ bowed LE (vit D def) + diffuse blistering rash over patellae (dermatitis herpetiformis) + diffuse muscle wasting + MCV 60L (iron deficiency), serum Ca+ 7.1L → celiac disease
    - Dx:
        - tTG-IgA *but IgA deficiency is common
        - If IgA deficient → check gliadin Ab (IgG)
        - Duodenal bx: flattening of microvilli, intraepithelial lymphocytes
    - Tx:
        - Avoid gluten
        - Vitamins
        - For dermatitis herpetiformis: dapsone
            - Caution in G6PD deficiency
- IgA deficiency
    - Anaphylactic transfusion reaction (type I hypersensitivity rxn)
- 8 mo drinks cow milk, causes bloody stool → milk protein allergy
    - Outgrown by age 1
    - Tx: formula with casein hydrolysate
- 5 yo kid w/ chronic constipation, immigrant from South America, rectal exam is accompanied by an explosive expulsion of poop → Hirschsprung's disease
    - Failure of neural crest cell migration to distal colon
    - Dx: distal colon biopsy w/ absence of Auerbach's plexus
    - Tx: resect affected bowel, end-to-end anastomosis
    - Association: Down syndrome
    - Mimic: Trypanosoma cruzi (Chagas) destroys enteric nervous system → megacolon
- 18 mo w/ recent URI, now with severe abdominal pain & bloody diapers + RLQ mass → intussusception
    - Pressure necrosis of bowel if not corrected quickly
    - Lead point for telescoping: Mecklel's diverticulum, hyperplasia of Peyer's patches in terminal ileum
    - Dx:
        - US w/ target sign
        - Air enema (diagnostic & therapeutic)
    - Tx: surgery is air enema not effective
    - If a kid gets septic after air enema? Think bowel perforation, do XR (see free air under diaphragm), give abx & straight to OR
- 4 yo with 12 hrs of severe abdominal pain and n/v + WBC 13k + US w/ echogenic material (likely fecolith) in the RLQ and fat stranding

    - Dx: Appendicitis
        - How to dx: US (Kid)
    - PE findings (challenging / not always given in Peds population vignettes)
        - McBurney's point tenderness
        - Psoas sign
        - Obturator sign (pain with internal rotation of hip)
        - Rovsing's sign (palpation of LLQ → pain in RLQ)
    - Tx: IVF, broad-spectrum abx (e.g. amp + gent + clinda/metro OR ceftriaxone + metro), lap appy
    - Complications: abscess, perforation

GENETICS REVIEW

- Myotonic dystrophy → trinucleotide repeat disorder
    - CTG repeat
- Fragile X Syndrome → trinucleotide repeat disorder
    - CGG repeat
- Angelman → maternal deletion or paternal uniparental disomy (both chromosomes from dad)
- Prader-Willi Syndrome → paternal deletion or maternal uniparental disomy (both chromosomes from mom)
- Beckwith Wiedemann Syndrome → imprinting disorder of chromosome 11, can be caused by paternal uniparental disomy
- Trisomy 21 → maternal nondisjunction or unbalanced robertsonian translocation
- Mom passing a disease to all her kids → mitochondrial inheritance
    - Ex: MELAS (Mitochondrial Encephalopathy, Lactic Acidosis, and Stroke-like episodes)
    - Ex: MERRF (Myoclonic epilepsy with ragged red fibers)
    - Ex: Leber's hereditary optic neuropathy & other optic neuropathies

CHROMOSOME DISORDERS

- Down's syndrome = Trisomy 21
    - Genetic pathophysiology?
        - maternal nondisjunction (failure to separate in meiosis I or II)
        - Robertsonian translocation (RT)
    - Early onset neuro dz? Alzheimer dz (presenilin is on chromosome 21)
    - Classic hematologic malignancy? ALL (TdT positive)
        - "ALL fall Down"
    - Considerations before beginning sports? Cervical XR to screen for atlanto-axial instability
    - Hand findings? Single palmar crease
    - Common cardiac defect? Endocardial cushion defects (endocardial cushion derived from neural crest)
    - Common GI defects?
        - Hirschprung's
        - duodenal atresia (bilious vomiting, double bubble)
        - pyloric stenosis (first 8 weeks of life, non-bilious vomiting, olive-shaped mass, erythromycin exposure increases risk)
    - Maternal quad screen findings
        - High beta-hcg & inhibin A

        - Low AFP & estriol
        - “HIGH” → Hcg & inhibin are high
    - How many chromosomes are found in a RT carrier (balanced RT)? 46
    - How many chromosomes are found in a patient with Downs Syndrome from a RT (unbalanced RT)? 46
- Prominent occiput + overlapping digits + clenched fists + rocker bottom feet → Edward syndrome (trisomy 18)
- Microcephaly + cleft lip/palate + polydactyly + rocker bottom feet → Patau syndrome (trisomy 13)
- 5 yo M with a long face, large ears, and large testicles → Fragile X syndrome
    - CGG repeat
    - Inheritance? X-linked, trinucleotide repeat
        - Genetic anticipation (worsens with each generation)
    - Dx: FMR1 genetic testing
    - Psych association: ADHD, Autism
    - Neuro association: mild intellectual disability, seizures
        - Most common cause of inherited ID in the US!
- Tall male + Gynecomastia + Infertility + no facial hair → Kleinfelter syndrome
    - Karyotype? 47XXY
- Female with a low posterior hairline, webbed neck, congenital lymphedema or cystic hygroma, and short stature → Turner syndrome
    - Karyotype? 45X
    - Aortic pathologies? Bicuspid aortic valve → early AS, coarctation of the aorta → hypertension in arms & hypotension in legs
    - Renal pathology? Horseshoe kidney
    - How can the short stature be corrected? Give growth hormone
    - How can the development of secondary sexual characteristics be promoted at puberty? Give estrogen
    - What is the “kind” of hypogonadism associated with this disorder? hypergonadotropic hypogonadism (streak ovaries → no estrogen → no negative feedback → high LH/FSH)
    - As an aside, what is the male equivalent (similar findings) of Turner’s syndrome? Noonan syndrome
        - Is this disorder only present in males? NO!
        - What is the mechanism of inheritance? AD
        - Genetic mutation? PTPN11 mutation
        - What is one good “cardiac clue” on exams to help with differentiating this counterpart from Turner’s syndrome? RVOT problems (e.g. pulmonic stenosis)

IMPRINTING DISORDERS

- Male with short stature, obesity, small testicles & penis, huge appetite → Prader-Willi syndrome
    - Neonate: hypotonic, feeding difficulties, cryptorchidism
    - Paternal chromosome is usually “on”, maternal chromosome is imprinted
    - Deletion of paternal chromosome
        - “Prader has no papa”
    - Maternal uniparental disomy

- Female with ataxia, small face, uncontrollable laughter → Angelman syndrome
    - Maternal chromosome is usually “on”, maternal chromosome is imprinted
    - Deletion of maternal chromosome
        - “M” in AngelMan for Mom
    - Paternal uniparental disomy

VACTERL / CHARGE / CATCH-22 ASSOCIATIONS

- VACTERL association
    - V = vertebral
    - A = anal atresia
    - C = cardiac defect
    - TE = TE fistula (often with esophageal atresia)
    - R = renal defect
    - L = limb defect
- CHARGE association
    - C = coloboma (keyhole defect in iris)
    - H = heart defect
    - A = atresia of the choanae (blue but pinks up when they cry)
    - R = retardation
    - G = GU anomalies
    - E = ear anomalies
- CATCH-22 association? DiGeorge syndrome = velocardiofacial syndrome
    - Failure of 3rd and 4rd pharyngeal pouches, derived from endoderm, to develop normally
    - Cardiac abnormality (commonly interrupted aortic arch, truncus arteriosus and tetralogy of Fallot)
    - Abnormal facies (e.g. micrognathia)
    - Thymic aplasia (no thymic shadow on newborn CXR) → T cell deficit → viral & fungal deficits
    - Cleft palate & cognitive deficits
    - Hypoparathyroidism → hypocalcemia → seizure and/or QT prolongation
    - 22q11 deletion

Ep. 19: Neurology Shelf review part 1

- Brain tumor that causes loss of “vertical gaze” → pinealoma (causes Parinaud’s syndrome)
    - Pathophys? Compression of superior colliculus, which is the vertical conjugate gaze center

- 13 mo child with history of hypopigmented macules + seizures. → tuberous sclerosis
    - Hypopigmented macules = ash leaf spots
    - Associated seizure syndrome? West syndrome (infantile spasms)
        - EEG finding? **Hypsarrhythmia**
        - Tx? ACTH or vigabatrin

- Most common primary brain tumor in kids → pilocytic astrocytoma
    - Histology? Rosenthal fibers

    - Marker? GFAP (glial cell marker)

- Medulloblastoma
    - Location? Cerebellar vermis
    - Histology? Homer-Wright rosettes

- Brain tumor presenting as hydrocephalus → ependymoma
    - Histology? Perivascular pseudorosettes or ependymal rosettes

- Brain tumor causing visual problems in kid → craniopharyngiomas
    - Derived from? Rathke's pouch
    - Imaging? Calcified suprasellar mass
    - Complications?
        - Bitemporal hemianopsia (2/2 optic chiasm compression)
        - Anterior pituitary hormone deficiencies (2/2 pituitary stalk/gland compression)

- MC cause of brain tumor in adults → metastasis
    - Location? Grey-white junction
    - Imaging? Multiple well-circumscribed lesions

- Most common primary brain tumor in adults → GBM
    - Imaging? Butterfly-shaped mass that crosses corpus callosum + edema + central necrosis
    - Marker? GFAP (glial cell marker)
    - MC brain tumor excluding mets

- Bilateral acoustic neuromas
    - Pathophys? Schwannoma of CN8
    - Location? Cerebellopontine angle
        - #1 MC tumor at cerebellopontine angle → acoustic neuroma
        - #2 MC tumor at cerebellopontine angle → meningioma
    - Tumor marker? S-100
    - Associated syndrome? NF-2

- Brain tumor that presents as parasagittal mass along falx cerebri → meningioma
    - Histology? Psammoma bodies ("laminated calcifications")

- 2 yo child with abdominal mass that crosses midline + myoclonus + weird eye movements + calcified mass on imaging → neuroblastoma
    - Alternate location: posterior mediastinum
    - Associated syndrome?
        - NF-1
        - Beckwith-Weideman syndrome
            - Neuroblastoma / Wilms tumor / hepatoblastoma
            - Hemihypertrophy
            - Macroglossia

        - Enlarged abdominal organs
        - Abdominal wall defects
        - Hypoglycemic seizure in newborn
            - Pathophys? hyperplasia of beta cells of pancreatic islets
- 2 yo child with abdominal mass that does not cross midline + no calcifications → Wilms tumor
- Frontal lobe tumor → oligodendroglioma
    - Histology? fried egg appearance
- Brain tumor that produces EPO → hemangioma blastoma
    - Associated syndrome? VHL syndrome
    - Treat because they can cause a life-threatening hemorrhage!

- Recent viral illness + vertigo + tinnitus → labyrinthitis
- Feeling like room is spinning with positional changes + nystagmus with provocative maneuvers → BPPV (caused by otolith displacement)
    - Diagnostic maneuver? Dix-Hallpike
    - Tx? Epley / Semont maneuver

- Anesthesia over medial thigh + weak thigh adduction → obturator nerve injury
    - Nerve roots? L2-L4

- Anesthesia over lateral thigh → lateral femoral cutaneous nerve injury

- 7 yo kid with ataxia + hypertrophic cardiomyopathy + LE hyporeflexia → Freidrich's ataxia
    - Pathohpys?
        - GAA repeats → LOF mutation in frataxin gene (iron binding protein) → iron overload causes oxidative damage
            - Destruction of dorsal columns of spinal cord → hyporeflexia
            - Cerebellar destruction → ataxia
    - Inheritance? AR
        - Unlike other trinucleotide repeat disorders, which are AD
    - Repeat? GAA
    - MC cause of death? CHF 2/2 hypertrophic cardiomyopathy

- 35 yo F with a BMI of 35 with visual difficulty and severe intermittent headaches. She takes tetracycline for acne. → idiopathic intracranial hypertension ("pseudotumor cerebri")
    - Imaging/Procedure Mgmt:
        - 1st step? Fundoscopic exam → shows papilledema
        - 2nd step? Head CT → is normal
        - 3rd step? LP → shows elevated OP
    - Tx?
        - Weight loss
        - Acetazolamide (carbonic anhydrase inhibitor)
        - Serial LPs
        - VP shunt
    - Tx for severe visual difficulties? optic nerve fenestration (relieves pressure)

    - Triggers?
        - Tetracyclines (i.e. female patient getting acne tx)
        - Vit A derivatives

- Management of ischemic stroke (caused by blockage w/i blood vessel)
    - Initial imaging? Non-contrast head CT to DDx ischemic stroke vs. hemorrhagic stroke b/c blood looks just like contrast ☺
    - Next imaging? MRI
    - Time window for tPA administration? 3-4.5 hrs
        - Up to 6 hrs if you can inject tPA directly into involved vessel
    - HY contraindications to TPA administration
        - Bleeding disorder
        - GI bleeding
        - Recent brain surgery
    - Blood pressure management?
        - Permissive HTN (BP up to 220/120) in patients with ischemic strokes only in pt's that cannot NOT get TPA
            - Why? Increased BP keeps vessels perfused, which optimizes blood flow to ischemic penumbra of brain
        - If getting tPA, BP < 185/110
        - If hemorrhagic stroke with high BP, can lower BP with labetalol, nitroprusside, nicardipine

- 78 yo has 15 min episode of complete vision in one eye that has since resolved. → amaurosis fugax (TIA)
    - Classic presentation? Painless loss of vision in one eye, "curtain coming down"
    - Dx?
        - Non-contrast head CT
        - Brain MRI
        - Echo (to look for origin of clot)
        - Carotid US
    - NBSIM? Probably carotid US on shelf exam
    - Prevention of further episodes?
        - Aspirin
        - Aspirin + dipyridamole
        - If aspirin contraindicated, clopidogrel
    - Indications for carotid endo
        - >70% stenosis
        - Symptomatic
    - #1 modifiable RF for a stroke? HTN

- 6 yo M with difficulty walking + uses arms to "walk up" his legs/thighs (Gower's sign) + hypertrophy of calves bilaterally. → Duchenne muscular dystrophy
    - Gene? *DMD*
    - Mutated protein? Dystrophin (stabilizes sarcolemma to cytoskeleton)
    - Inheritance? X-linked recessive

  - Dx?
    - Increased creatine kinase levels
    - Genetic testing for dystrophin gene mutation
  - Tx?
    - Steroids
    - High-calorie nutrition
  - MC cause of death? Respiratory failure or cardiac causes
- Muscular dystrophy + intelligence + life expectancy in the 50s → Becker muscular dystrophy
  - Pathophys? Have some functional dystrophin
  - Gene? *DMD*
  - Mutated protein? Dystrophin
  - Inheritance? X-linked recessive

- Ataxia + confusion + ophthalmoplegia → Wernicke encephalopathy
  - Reversible
  - Imaging? Hemorrhagic infarct of mamillary bodies
  - Pathophys? Vitamin B1 deficiency
  - Function of which enzyme affected? Transketolase in pentose phosphate pathway
    - Decreased transketolase activity
  - Tx? IV thiamine then glucose
  - **Note**: “ophthalmoplegia” means eye problem; pt’s with Wernicke-Korsakoff can have any eye problem, e.g. nystagmus, lateral gaze palsy, etc.
- Complication of untreated Wernicke encephalopathy? Korsakoff syndrome
  - Irreversible
  - Sxs: ataxia + confusion + ophthalmoplegia + **amnesia + confabulation**

- 40 yo F with diplopia or droopy eyelids worse at end of day + difficulty swallowing + weird speech → myasthenia gravis
  - Pathophys? Antibodies to post-synaptic nicotinic ACh receptor
  - Dx? anti-AChR or anti-MUSK Ab testing
    - NOT edrophonium test/Tensilon test (no longer standard of care)
  - Tx? AChE inhibitors (e.g. pyridostigmine)
  - Associated malignancy finding? Thymoma (anterior mediastinal mass)

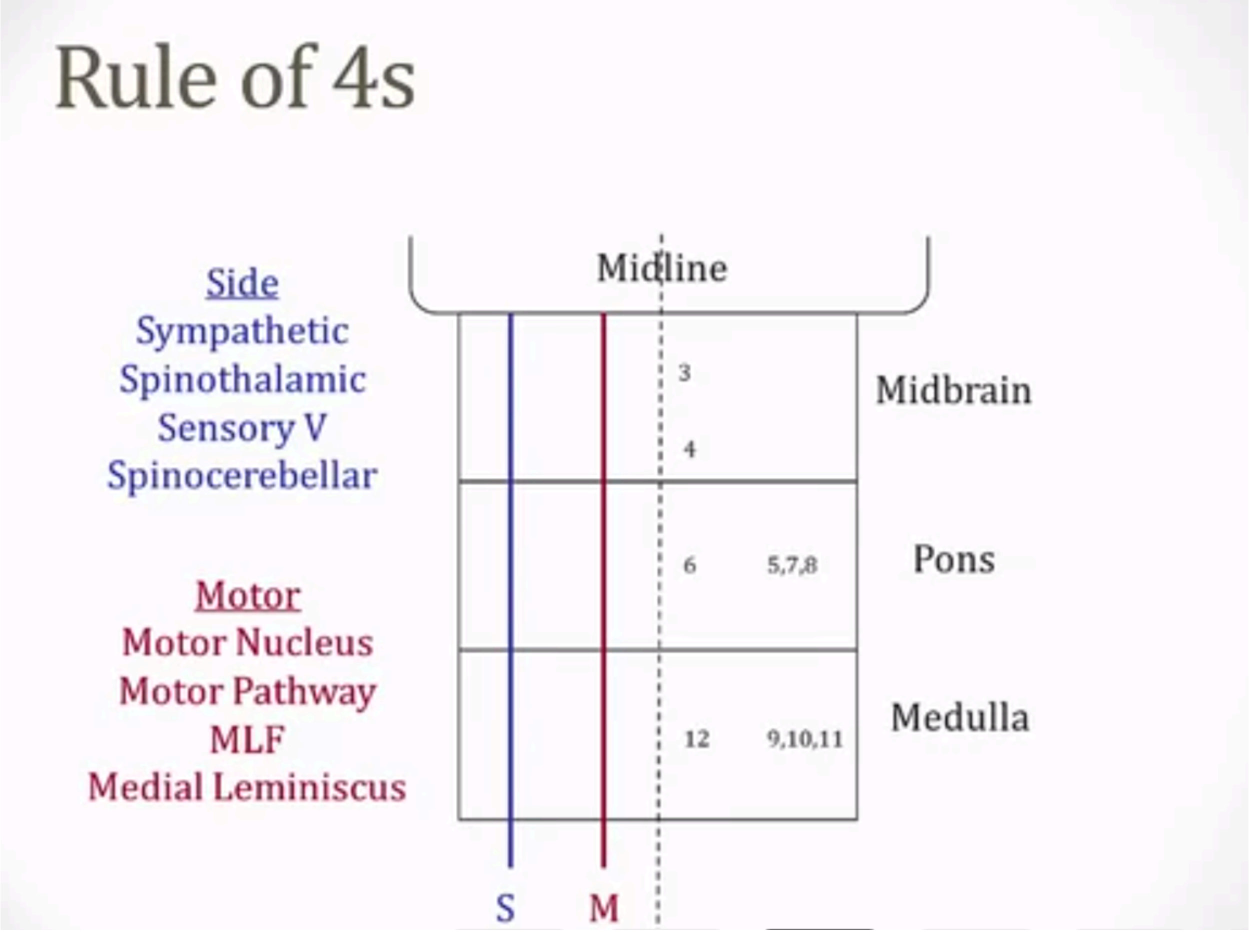
- NBSIM for patients with myasthenia gravis? CT chest to look for thymoma
  - b/c removal of thymoma can resolve myasthenia gravis

- Smoker with proximal muscle weakness that improves with use → LEMS
  - Pathophys? Antibodies to presynaptic voltage-gated Ca++ channel

- **Lateral medullary syndrome (Wallenberg syndrome) causes dysphonia, dysphagia, and loss of gag reflex**
  - Blood vessel occluded? **PICA occlusion**
  - Loss of pain and temperature on left face → L trigeminal nerve
  - Loss of pain and temperature on right side of the body→ L spinothalamic tract

        - Located in lateral brainstem
        - Decussates at anterior white commissure → contralateral sxs
    - **Absent gag reflex, dysphonia, dysphagia → CN9/10**
        - Medulla
    - Vertigo → CN8
        - Pons/Medulla
    - Ptosis and miosis on left (Horner's) → L sympathetic tract to superior cervical ganglion
        - Located in lateral brainstem

- **Medial medullary syndrome causes tongue deviation to ipsilateral side**
    - Blood vessel occluded? **Anterior spinal artery occlusion**
    - Right sided paralysis → L corticospinal tract
        - Runs through medial brainstem
        - Decussates at level of medullary pyramids
    - Tongue deviation to the left. → L CN12
        - **Tongue deviation to ipsilateral side**



Rule of 4s
Side
Sympathetic
Spinothalamic
Sensory V
Spinocerebellar
Motor
Motor Nucleus
Motor Pathway
MLF
Medial Leminiscus
Midline
3
4
Midbrain
6
5,7,8
Pons
12
9,10,11
Medulla
S
M

- A 35 yo **African American female** with 3-day history of **eye pain**. Funduscopic exam is notable for **conjunctival erythema** and **miosis**. CBC is notable for **increased ACE levels** and **Ca2+ of 12.9**. **CXR**

with bilateral lymphadenopathy. What is the cause of her eye symptoms? → optic neuritis 2/2 sarcoidosis

  - Exam finding? **APD + pain with eye movements (this is optic neuritis!)**
  - Another condition a/w optic neuritis? Multiple sclerosis

- 35 yo F with tremors in her hands bilaterally that are worsened by stretching out her hand. Better with alcohol. → benign essential tremor
  - Inheritance? AD
  - Tx?
    - Beta blocker (e.g. propranolol)
    - Barbiturates (e.g. primidone)
      - Mechanism? Increase duration of opening of chloride channels → hyperpolarization

Benign essential tremor:	Parkinson's disease tremor:
▪ Bilateral ▪ Worse with activity ▪ Tx: propranolol	▪ Unilateral/asymmetric ▪ Worse at rest ▪ Tx: levodopa/carbidopa; dopamine agonists; COMT inhibitors; NMDA antagonists; MAO-B inhibitors; antimuscarinics

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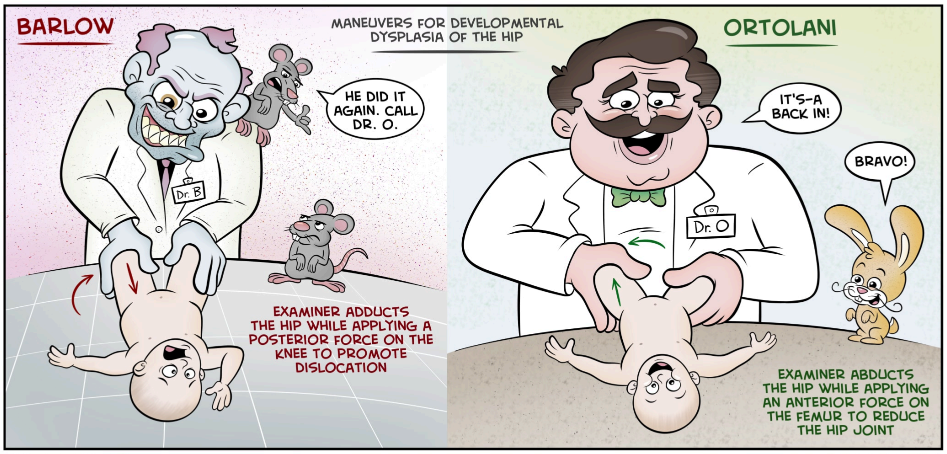
Ep. 21: Comprehensive Pediatric 3rd Year Shelf Review


BARLOW
MANEUVERS FOR DEVELOPMENTAL DYSPLASIA OF THE HIP
ORTOLANI
HE DID IT AGAIN. CALL DR. O.
IT'S-A BACK IN!
BRAVO!
Dr. B
Dr. O
EXAMINER ADDUCTS THE HIP WHILE APPLYING A POSTERIOR FORCE ON THE KNEE TO PROMOTE DISLOCATION
EXAMINER ABDUCTS THE HIP WHILE APPLYING AN ANTERIOR FORCE ON THE FEMUR TO REDUCE THE HIP JOINT

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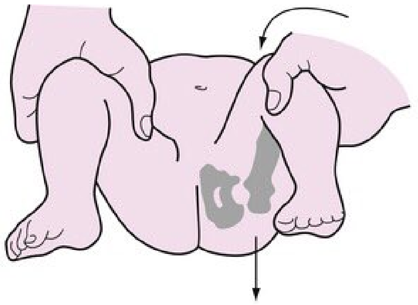
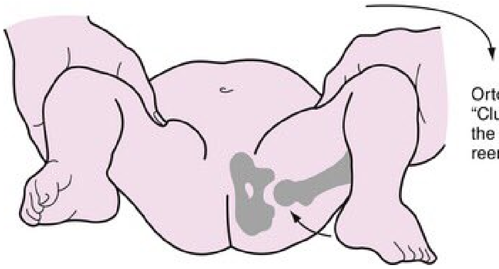
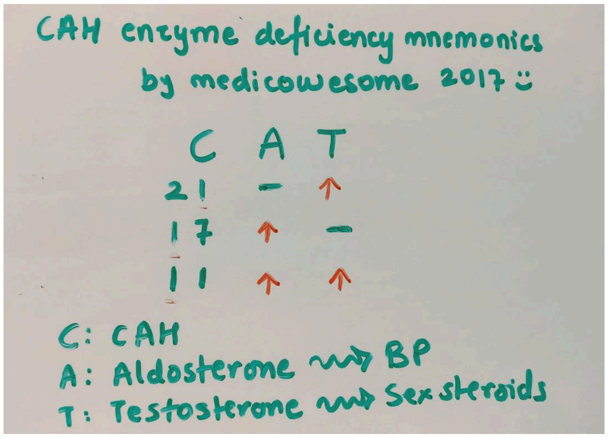


Barlow's maneuver:
"Clunk" of exit as the
femur is dislocated
from the acetabulum



Ortolani's maneuver:
"Clunk" of entry as
the dislocated femur
reenters the acetabulum

- CrouP treated with raCemiC ePinephrine
- Seizure disorders by age range
    - Baby w/ hypsarrhythmia → West Syndrome (tuberous sclerosis)
    - KId 2-6 yo → Lennox-Gastaut
    - Teenager → JME



CAH enzyme deficiency mnemonics
by medicowesome 2017 :)

	C	A	T
	21	—	↑
	17	↑	—
	11	↑	↑

C: CAH
A: Aldosterone ⇝ BP
T: Testosterone ⇝ Sex steroids

- Associations with eosinophils
    - Erythema toxicum neonatorum
    - Chlamydia pneumonia
- Empiric tx of neonatal sepsis per WHO? Ampicillin + gentamicin

Peritonsillar abscess	Retropharyngeal abscess
Teens Overall not-sick kiddo "Hot potato" voice	Kid < 5 yo Toxic-appearing kid Neck asymmetry

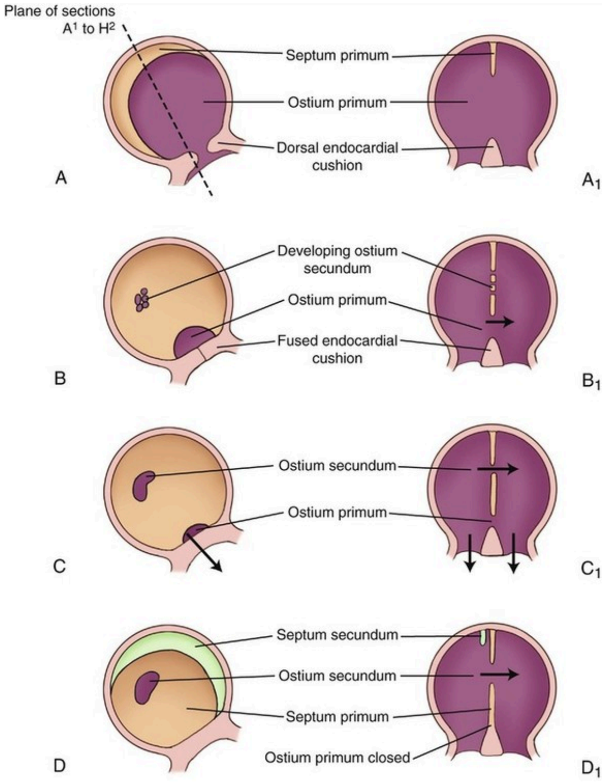
Uvular deviation	Inability to extend neck Widened prevertebral tissue on lateral neck XR

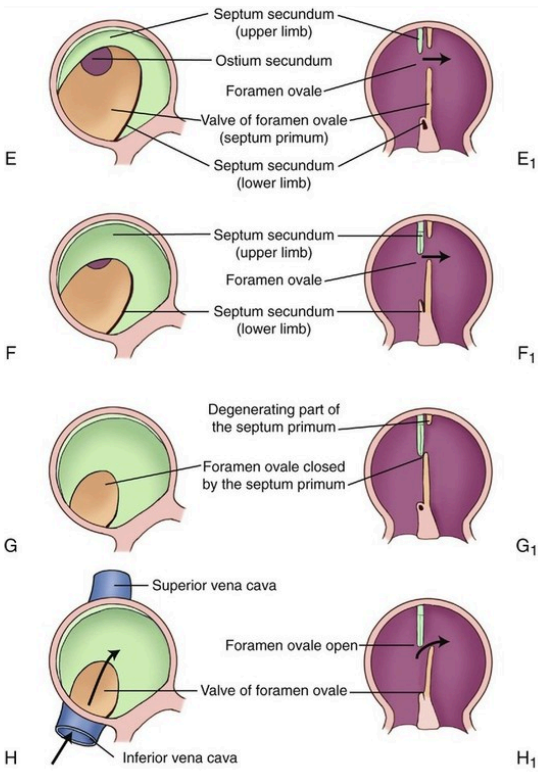
- ID, low BW, microcephaly, high pitched cat like cry → cri-du-chat
- Obesity, infantile hypotonia, ID, small extremities, Cr 15 deletion → Prader-Willi
- Happy mood, ID, inappropriate laughter, ataxia, Cr 15 deletion (mom) → Angelman syndrome
- “Elfin facies”, short upward turned nose, long philtrum → Williams syndrome
- X-linked, CGG repeat, anticipation, long face, large ears, ID, macroorchidism → Fragile X
- Short palpebral fissures, thin upper lip, smooth philtrum, microcephaly, VSD → FAS
- Tricuspid valve displaced downward, RV hypoplasia → Ebstein’s anomaly (Li toxicity(
- Lateral neck mass that does not move with swallowing, derived from ectoderm → branchial cleft cyst
- Midline neck mass, moves with swallowing, may have ectopic thyroid tissue → thyroglossal duct cyst
- Hypopigmented macules identified with Wood’s lamp, shagreen patches, adenoma sebaceum (face), infantile spasms, subependymal nodules in brain, cardiac rhabdomyooma, renal angiomyolipoma → tuberous sclerosis

- Severe fasting hypoglycemia, lactic acidosis, hepatomegaly, gout, may have kidney sxs (since this also does gluconeogenesis), no muscle sxs, give cornstarch → Von Gierke disease (GSD type 1)
    - Deficiency of? Glucose-6-phosphatase
    - V for “very bad”
    - Also remember the two L’s (liver only & lactic acidosis)
- Glycogen storage disease associated with heart failure and death at < 2 yo → Pompe disease (GSD type 2)
    - Deficiency of? Lysosomal alpha-glucosidase = acid maltase
    - P for “pump”
    -
- Mild hypoglycemia, hepatomegaly, muscle sxs, no lactic acidosis → Cori disease (GSD 3)
    - Deficiency of? Debranching enzyme
    - C for “combined” (muscle & liver sxs)
- No lactic acidosis, muscle weakness, no hepatomegaly → McArdle’s dz (GSD type 5)
    - Deficiency? glycogen phosphorylase (removes one glucose from the chain)
    - M for “muscle”

- High-yield lymphadenopathy
    - Anterior cervical → strep
    - Posterior cervical → mono
    - Posterior auricular & suboccipital → rubella
    - Unilateral → Kawasacki

- Ostium primum defects associated with Down’s
    - Ostium primum is down by the endocardial cushions so this makes sense


Plane of sections
A¹ to H²
Septum primum
Ostium primum
Dorsal endocardial cushion
A
A1
Developing ostium secundum
Ostium primum
Fused endocardial cushion
B
B1
Ostium secundum
Ostium primum
C
C1
Septum secundum
Ostium secundum
Septum primum
Ostium primum closed
D
D1


Septum secundum (upper limb)
Ostium secundum
Foramen ovale
Valve of foramen ovale (septum primum)
Septum secundum (lower limb)
E
E1
Septum secundum (upper limb)
Foramen ovale
Septum secundum (lower limb)
F
F1
Degenerating part of the septum primum
Foramen ovale closed by the septum primum
G
G1
Superior vena cava
Foramen ovale open
Valve of foramen ovale
Inferior vena cava
H
H1

- Transposition of the great vessels associated with (pre-existing) maternal diabetes
    - "Egg on a string" on CXR
- Truncus arteriosus associated with DiGeorge
- Tricuspid atresia
    - Need ASD + VSD OR ASD + PDA
    - LAD on EKG
- Tetralogy
    - Squatting helps during Tet spells because it increases SVR (which decreases the R to L shunting)

Ep 22 [OBGYN Shelf Review]

22 y/o G1P1 visits her obstetrician 1 week after delivering a 6 lb 4 oz boy. Delivery unremarkable. Apgars * and (at 1 and 5 minutes. Plans to have her next baby when she graduates from graduate school 2 years from now. In addition to routin screening for post partum depression, what is the next best step in the management of this patient?

- Best answer is injectable bc you don't want to give estrogen in this OCP-> this will cause difficulty breastfeeding. MOA's- progestin only contraceptives- protect ag endometrial cancer, thicken cervical mucus. CI - If you have a malignancy that is progestin receptor + (lobular carcinoma in situ, invasive lobular carcinoma)- avoid progestin containing contraceptives. Side effect of injectables- can cause weight gain, reversible decrease in bone mineral density

Treat mastitis with dicloxacillin

Breast feeding = high prolactin state. Prolactin-> Shutting down HPG axis-> less production of "stuff" that causes breast cancer-> = decreased risk of breast cancer, decreased ovulation (destroying ovarian epithelium less)-> less risk of ovarian cancer. Helps to lose pregnancy weight.

Breast feeding contraindications

- If lady has active TB, HIV- do not breast feed
- Galactosemia- galactose 1 phosphate uridyl transferase deficiency - definite CI to breastfeeding
- Mastitis- NOT a breast feeding contraindication. She SHOULD breast feed bc this will help clear the infection

Q2

- 22 y/o female is tearful 3 days after delivery = post partum blues. Just reassure. Usually see in first 2 weeks of delivery.
- 22 y/o is brought to ED by husband 3 days after delivery. Sees a radio taped to her head, she claims she is receiving information from outer space about how sacrificing her baby will help solve world hunger. = postpartum psychosis. This is an indications for involuntary hospitalization, prescribe antipsychotics. High risk of infanticide if you do not involuntarily hospitalize her
- 22 year old female comes to 3 week post partum appt. She looks disheveled, and occasionally has thoughts of hurting the baby, which she feels remorseful about. She is breastfeeding, but no longer enjoys activities she loves before she got pregnant. She is accompanied by supportive husband. = post partum depression. See this more than 2 weeks after delivery, can see in immediate period after delivery as well.

Q3

4 days after c section of a 9 lb female, a 33 y/o G2P2002 complains of abdominal pain. Vitals are normal (BP-120/80, HR 99, Resp 19). She is febrile. She has diffuse lower abdominal tenderness and foul smelling

lochia. C section was due to arrest in active pahse of labor. Most important risk factor in this presentation? = endometritis, biggest risk factor is c section (more so than maternal infection prior to delivery) - tx = clind + gent

- Do not confuse endometritis with chorioamnionitis. More important risk factor here is prolonged rupture of membranes. This will be a patient with fever during labor, fetal tachycardia, foul smelling lochia. Tx- amp + gent. Amp covers listeria. Give IV oxytocin to help deliver baby faster.
- Listeria- if you see a lady with a stillborn and abscesses all over the body, this may be granulomatosis infanticeptica = congenital listeriosis. Can kill the baby in utero.
- Rupture of membrane >18 hr- give GBS ppx

Diagnosing and dating pregnancy

- Check BhCG in urine or serum- serum shows up a week before the urine
    - When is checking bhcg the NBSIM?
        - Woman has ammenorrhea
        - s/s ectopic pregnancy
- Date
    - First day of LMP + 7 days, subtract 3 months, add 1 year
- GTPAL - G4P3104
    - G = gravidity, how many times you have been pregnancy
    - T = # of term pregnancies
    - P= # preterm pregnancy
    - A = # abortions
    - L = # living children

Q4

Do you want to be a pregnant millionaire??

- blue/purple vagina = chadwick's sign
- Blotchy pigmentation of the face = melasma
- Arterial BP in first 20 weeks- should go down bc of high levels of progesterone, a smooth muscle relaxant-> decrease in SVR. may get higher after first 20 weeks, but shouldnt get higher than before you were pregnant
- Plasma volume goes up. Think of birth as a bloody experience- the body prepared for this by boosting up moms plasma vol by 50%
- SVR- decreases bc progestin
- Oncotic pressure- decreases. Albumin goes down in the blood too
- CO- increases bc increased volume = increased preload
    - Decreases when supine- uterus is compressing the IVC
        - Nonreassuring fetal heart tone- tell mom to lay in LLD position
- RBC mass- goes up by 30%
    - Hematocrit - a concentration measure. RBC mass is not increasing as much as plasma volume, so hematocrit is decreased- this is Physiologic anemia of pregnancy
- Coagulation factors- increase. You can think of this as mum is bound to bleed out a lot during birth, so lets make it easier to clot to prevent massive blood loss
    - In general, every protein in the bloodstream increases during pregnancy, with the notable exception of Albumin

- Gastric motility- high levels of progestin-> smooth muscle relaxation-> decreased motility, increased gastric emptying time, GERD
- Acid base- see alkalosis. If mom is alkalotic relative to the fetus, it creates a gradient for the fetus to dump CO2 into mom's circulation across the blood placental barrier.
- Tidal volume- increases
- Ureter size- consider progestin-> dilation. This could contribute to increased stasis + increased UTI's in pregnancy
- BUN/Cr- both decrease. If elevated, this is a concerning sign
    - If blood volume is increasing, your hydrostatic pressure is increasing in the glomerulus
    - GFR + cr clearance should go up
- Glucose and protein in the urine- increase. Transport maximum for glucose in the PCT goes down in pregnancy. Very mild proteinuria is fine.
- Pituitary size- should double in size. If lady bleeds out a lot during delivery, hypoperfusion of pituitary can occur, = ischemic stroke of pituitary gland (sheehan's syndrome). Presentation = failure to lactate after pregnancy
- Size of thyroid- increases. You need thyroid for proper fetal development
    - Estrogen- increases synthesis of thyroxine binding globulin, so TBG goes up, and total thyroid hormone levels will go up, free thyroid levels are normal.
- BHcg - doubles every 2 days- increases until 10 weeks, then levels off/ tapers somewhat

Q5

32 y/o female 36 w gestation comes to ED because she hasn't felt her baby move for 6 hours. Physical exam shows 37 cm from tip of pubis to top of uterus, no fetal heart tones detected on doppler u/s. Rest of exam is within normal limits. BP 105/78, HR 78, RR 16, mildly febrile. In addition to patient centered counseling and physician empathy, NBSIM? = induction of labor with IV oxytocin. Do not postpone delivery- retained fetal products can lead to DIC. NEVER do a c section- risk of surgery isnt worth it.

Q6

25 y/o primigravida at 10 weeks gestation presents for a first prenatal visit. Maternal exam and VS wnl. Maternal hgb is 11 g/dL. WBC = 6,000. Pap smear 5 months ago is unremarkable. Rubella titers WNL. HBV Surface antibody +, surface antigen negative. Core antibody negative. HIV/syphillis/chlamydia all negative. NBSIM?. Urinalysis- screen for ax bacteriuria. Progestin effect causing ureter dilation and stasis-> increased risk UTI's. Asx bacteruria can progress to pyelo if unnoticed. tx - normal non preg female- wouldnt treat asx bacteriuria unless it was complicated. In preg woman- tx with nitrofurantoin, amoxicillin, phosphomycin. If pyelo, give IV ceftriaxone. Pyelo can increase risk of preterm delivery- maintain this lady on nitrofurantoin for the rest of the preg. After treating, perform a test of cure.

- Do not give preg ladies excessive Vitamin A or live vaccines. Give folate.

Q7

What is the most appropriate time frame for the following interventions/prenatal tests

- rh d immune globulin in an rh negative female
    - 28 w
- GBS swab
    - 35-37 w
- Screen for gestational diabetes - 1 hour gtt, confirmatory is 3hr.

        - 24-28 ish w
        - Tx- diet, exercise, insulin is probably first line though
        - ACOG- beginning to feel more comfortable using metformin and glyburide
- Chorionic villus sampling
    - 10-13 w
- Screening u/s for neural tube defects
    - 18-20
- Amniocentesis, quad screen
    - After 15 w
- In the question stem, mom will be concerned about her baby's risk of chromosomal problem etc- will give w of pregnancy in the q- use this to rule answers out.
- ***doing an invasive procedure that mixes mom and baby blood like this- give Rh d immunoglobulin!
- More info on prenatal testing
    - Elevated AFp- think neural tube defect. Also see elevated acetylcholinesterase in the amniotic fluid. May also occur in abdominal wall defect, i.e. omphalocele/gastroschisis
        - MCC- incorrect dating
    - See increased level of inhibin A + bhcg, afp/estriol is decreased - think Downs. Arises from maternal nondisjunction, robertsonian translocation
    - See decreased inhibin A, bhcg, AFP/estriol all low. Kid has rocker bottom feet, overlapping digits and toes.
    - Quad screen is + -Get an u/s
    - Lecithin : sphingomyelin is 2+, this is a sign of lung maturity.

If a lady has a history of 2nd trim painless preg loss, i.e. from cervical insufficiency- can place a cerclage. But, cerclage means CI to exercise

Gestational DM
- From human plactental lactogen- a diabetogenic hormone. Its job is to create hyperglycemia in mom so that she can shunt more energy to the fetus. GDM can cause macrosomia, polyhydramnios (AF >25)- (baby will have hyperglycemia, and will make more urine). When baby is delivered, no longer is exposed to hyperglycemia. Their pancreas will keep making insulin-> triggers hypoglycemia-> seizures. Also can have seizures from hypocalcemia
- Baby Cqx from GDM vs DMII mom
    - Chronic DMII
        - Kids have cardiac probs, i.e. hypertrophic Cm
        - Fusion of legs (sirenomelia)
        - Sacrum doesnt develop right= caudal regression syndrome
        - Hypocalcemic seizures
        - >4500g - recommend elective c section

Q8
Recommended weight gain from preg
- BMI underweight- gain 28-40 lb
- BMI 23- gain 25-35 lb
- BMI overweight- gain 15-25 lb
- BMI obese- 11- 20 lb

Q9

- 39 year old female with mood swings, amenorrhea for the past year. Has severe episodes of intense sweating and palpitations once or twice daily. Meds include levothyroxine, on physical, see skin hyperpigmentation. = premature ovarian failure
  - Ovaries stop working-> estrogen goes down-> FSH/LH goes up because there is no negative feedback
  - Tx menopause-
    - dyspareunia- lubricant, vaginal estrogen to build back up vaginal epithelium.
      - Vaginal estrogen is CI if Hx of Estrogen responsive malignancy
    - Osteoporosis (estrogen increases synthesis of osteoprotegrin- this binds up RANKL which decreases activation of osteoclasts.). Supplement Ca, VD, bisphosphonates (first line in osteoporosis), raloxifene (a SERM in the breast and uterus, agonist in bone!)
      - Obesity is a protective factor for osteoporosis. Anorexics will have increased risk of osteoporosis.
        - Obesity will also increase risk of osteoarthritis
    - Severe menopausal sx- (use short course 6 months) HRT, used combined estrogen and progestin to have less problems.
      - CI- If lady has estrogen responsive malignancy, hx of strokes, migraine with aura, hepatic adenoma
- 19 y/o female presents with intense anal pruritis. Physical exam reveals erythema of the vulvovaginal area. She recently completed a course of ciprofloxacin for lobar pneumonia. She has a hx of DMI and pH of vaginal secretions of 4.3. KOH prep shows spores and structures resembling hyphae = candida
  - Trich and gardnerella- pH >4.5.
    - BV from gardnerella- see fishy smell, KOH shows clue cells. Take metronidazole, counsel not to take alcohol concurrently- dont want disulfiram effect from inhibition of acetaldehyde dehydrogenase
    - Dont need to treat partner for candida or gardnerella
    - Trich- treat partner as well to prevent recurrence. Tx with metro
      - Punctate hemorrhages (strawberry cervix), frothy green foul smelling discharge
    - Metro can treat GET GAP: Giardia, Entamoeba, Trich, Gardnerella, Anaerobes belows the diaphragm, Protozoal infections
  - Risk factors for candida- immunosuppression, diabetes, recent antibiotic use
  - Tx- antifungal cream, or oral fluconazole

Q10

34 y/o female at 10 weeks gestation is brought to ED by husband, who is concerned about her severe vomiting for the past week. Physical exam shows skin tenting, >20 mmHg change in BP from supine to standing position, weighs 131 lb (recorded in chart at 140 lb 3 months ago). Further testing would reveal- a hypokalemic hypochloremic metabolic alkalosis (hyperemesis gravidarum)

- She is losing a lot of acid with vomiting, becomes hypochloremic. Losing acid = alkalotic. Volume down = RAAS activation-> principle cells ENAC transporter is working a lot-> excrete more K in the urine-> hypokalemia. If you increase activity of the proton ATPase pump, the a intercalated cells of the nephron, see alkalosis due to this as well because you are dumping more protons in the urine.
- She has lost more than 5% of her prepregnancy weight- this qualifies her for hyperemesis gravidarum.

- Tx - ondansetron, metochlopromide. Replace electrolytes, NBME likes thiamine
    - Eat small frequent meals, take vitamin b6 and doxylamine

Q11

26 year old female presents to obstetrician for yearly check up. PMH hypertension controlled with captopril and LSM. vitals WNL. BMI 23. Mirena IUD implanted 18 months ago, wants it removed. Got married 3 months ago, plans to have kids. Pap smear 2 years ago. In addition to routine guidance, and recommendations and appropriate vitamin supplementation, NBSIM? = switch captopril to alphamethyldopa.

- pap smear- good bc its q3 years from 21-29 years
- Captopril- not good for pregnant woman, its a teratogen. So are ARBs
- Chronic hypertension- HTN before you are pregnancy
- Gestational hypertension- >140/>90 after 20 w pregnancy, no proteinuria
    - Tx- “Hypertensive moms Love nifedipine”- Hydralazine, Methyldopa, Labetalol. Nifedipine
- Pre eclampsia- gestational hypertension + proteinuria
    - Pathophys is unk- recognize phrases like endothelial dysfunction, formation of abnormal blood vessels
    - Risk factors- most important = prior hx of preE
- PreE q/ severe features- they have some kind of end organ dysfunction, i.e. increasing BUN, Cr, LFTs, or BP is >160/>110
    - Consider Mg at this pt for seizure prophylaxis.
    - Check DTR’s- decreased is a telltale sign of Mg toxicity-> could lead to resp depression, CV collapse and die
        - Rescue agent for Mg toxicity= calcium gluconate
- PreE w/ seizure= Eclampsia
    - Tx- #1 mg. If mg doesnt work, give short acting benzo.
    - Definitive treatment- delivery
- HELLP
    - Hemolysis, elevated LFT, low platelets

Q12

Most common teratogen for each birth defect

- Hypoplasia of RV, downward displacement of tricuspid valve (atrialization of RV), mom is treated for bipolar.
    - = epstein anomaly due to lithium toxicity
    - Firstline med for mania in pregnancy is haloperidol
- Tooth discoloration
    - Tetracyclines
- Cartilage damage
    - Fluoroquinolones
- Stippling of epiphysis, dont use this anticoagulant in a pregnant lady with DVT
    - Warfarin
- Clear cell adenocarcinoma of the vagina
    - DES (diethylsilbestrol)- assoc with t shaped uterus
- Renal probs in the fetus
    - ACEi/ARBs

- Gray baby syndrome
    - Chloramphenicol- because neonates have very low levels of UDP glucuronysyl transferase, can not metabolize the drug
- Kernicterus
    - TMP-SMX
- Smooth philtrum, microcephaly,
    - FAS
- IUGR, hypoplastic nails, microcephaly, cleft lip
    - Phenytoin- fetal hydantoin syndrome
- Most dangerous anti epileptic/highest risk of neural tube defect
    - Valproic acid

G13

21 y/o female comes to PCP with severe facial acne. LMP 1 w ago. Stable relationship with BF of 3 months, use condoms inconsistently. See open and closed comedones clustered around patient’s lower face. Trials of tetracycline, benzoyl perized, and combined OCP yielded no positive results. Smokes 2 cigarettes a day. Requests prescription of isotretinoin. Most likely CI to isotretinoin = unprotected sex control.

- Isotretinoin prescription requires 2 forms of birth control
- 35 y/o female that smokes/hx of migraine with auras, hx thromboembolic disease, hepatic adenoma- any of these- OCP with estrogen isnt a good option
- See jittery newborn that is inconsolable- think opioid withdrawal- give methadone, taper
- Cocaine use in pregnancy can cause abruptio placentae- painful third trimester bleeding
- Use acetaminophen in pregnancy- using cox inhibitors can trigger premature closure of the ductus arteriosus.

G14

29 y/o G3P2 becomes unresponsive 15 min after delivering a 3900 g newborn. BP- 40/palpable, HR 40, RR 6, O2 sat 78%. See blood oozing from a venipuncture site = amniotic fluid embolism

Q15

Breast triggers

- 44 year old male treated for class 3 HF with gynecomastia
    - Spironolactone- is an aldosterone receptor antagonist, but also has androgen receptor blocking activity
- 32 y/.o 4w postpartum has fever, breast tenderness, and erythema-
    - Mastitis, tx with antistaph penicillins, i.e. dicloxacilin
- 22y/o with multiple mobile breast masses, become more painful and wax/wane in size with cycle
    - = fibrocystic changes
- 23 y/o female with solitary, mobile, well defined nontender breast mass
    - fibroadenoma
- Bloody nipple discharge
    - Intraductal papilloma
- 49 y/o female with large breast mass, core needle bx reveals structures of leaf like projections on histology
    - Phyllodes tumor

- BRCA mutation assoc with male breast cancer
    - BRCA 2
- Most common location of breast cancers
    - Upper outer quadrant
- Whats the receptor positivity most commonly found in LCIS
    - ER/PR+
- Most common invasive breast cancer
    - Invasive ductal carcinoma
- 55y/o female that presents with a breast mass, physical exam reveals peau d’orange
    - Inflammatory breast cancer
- 55y/o presents with an eczematoid scaly appearing lesion around the nipple
    - Paget’s disease of the breast
- Is there a difference in survival between lumpectomy + radiation or mastectomy for early stage breast cancer
    - NO
- NBSIM in female with DCIS with + sentinel LN bx
    - Do axillary LN dissection
- ER/PR + breast cancers tx
    - Tx- SERMS, aromatase inhibitors (anastrozole)
- Treat Her2Neu+ malignancies
    - Trastuzumab
- 45 y/o female with hx breast cancer tx had JVD, EF of 35%
    - Due to trastuzumab. This is reversible
    - If due to doxorubicin/daunorubicin- HF will be irreversible
        - Preventable with iron chelator dexraroxane
- 55 y/o female with 10 year hx of lymphedema from axillary LN dissection has weight loss, purplish necrotic ulcerating mass on L arm
    - Lymphangiosarcoma
- Breast cancer is floridly high yield- its very scenario based. The answers can vary from different sources. These answers are primarily from his best judgement from ACOG and online, but you should use your best research and email Divine questions

**core needle bx = excisional bx if the mass if small, well circumscribed

Q16A

- 45 y/o female has a palpable L breast mass she noticed when she took a shower 1 week ago.
    - NBSIM = mammogram first. Since she is older than 30, you do mammo first rather than u/s
    - Diagnostic mammo is negative-> do a core needle biopsy

Q16B

- 25 y/o female with breast pain- LMP started 3 days ago. PE shows multiple mobile breast masses. NBSIM- reassure, schedule follow up for a few weeks

Q16C

- 25 y/o presents to yearly gyn appt with complaint of a palpable breast mass she noticed while taking a shower.
    - See immobile, painless mass located close to the nipple. No FMH of breast cancer. NBSIM-get u/s

    - See immobile, painless mass located upper outer quadrant of breast. U/S shows solid mass. NBSIM- get a core needle bx
    - See immobile, painless mass located upper outer quadrant of breast. U/S shows cystic mass. NBSIM- get an FNA, send fluid for cytology, get a f/u u/s in a few weeks
        - If FNA were bloody, send it for cytology and do a core needle bx
        - If non bloody cyst recurs, get a core needle bx

Q16D

- American cancer society guidelines- screening mammos starting at 40 y/o annually. Divine says this is more reliable
- USPFTF guideline- start at 50, get q2y.
- Women with BRCA mutations get these mammos and also MRIs of the breast. Can do a prophylactic total abdominal hysterectomy and bilateral salpingo oophorectomy to prophylaxis ag breast, ovarian, and endometrial cancer.

Q17

33y/o G2P1 female presents to L&D at 34w gestation due to consistent uterine contractions. Last preg required classical c section due to severe obesity. As resident walks into the room, pt begins to complain of severe abdominal pain. Pelvic exam is notable for copious amounts of blood from vaginal canal. FHR shows HR of 33. Pt has hx cocaine use with current preg. ML Dx- uterine rupture

- NBSIM- crash c section
- Other common presentations of uterine rupture- palpating fetal parts in the abdomen, loss of fetal station
- Approach to third trimester bleeding
    - Painless
        - Placenta previa- low implantation of placenta
        - Vasa previa- bb's blood vessels overlie the cervical os
            - Deliver baby soon, this is an obstetric emergency
    - Painful
        - Uterine rupture
        - Abruptio placentae- see mom with cocaine use

Postpartum hemorrhage

- Definition according to ACOG- Blood loss >500mL after vaginal />1,000mL after c section
- Causes- "tone, tear, tissue, thrombin, topsy turvy"
    - MCC- uterine atony
        - Etio- Uterus is over worked in rapid labor, prolonged labor, uterus infection, gave too much tocolytics, multiple gestations, polyhydramnios, macrosomia
        - NBSIM - uterine massage under u/s guidance
            - IV oxytocin to contract it down
                - Can also give methergin
                    - (serotonin receptor agonist, like triptans- if a lady has a history of vasospastic angina or reynaud's phenomenon, you should not give methergin)
                - Can give Carboprost (Hemabate)
                    - Dont give to person with hx of asthma
                - Can give dioprostone - PG2 analog

            - Also Keeps PDA open
            - Avoid it in women with profound hypotension
        - B lynch sutures- “like suspenders on the uterus”
- Lacerations
    - Risk factors - precipitous delivery, difficult delivery i.e. shoulder dystocia, operative vaginal delivery.
    - Tx- surgery
- Retained placental tissue
    - More common when a succenturiate lobe of placenta is present, with an invasive placenta (placenta accreta)
    - Tx- d&c
- DIC
- Uterine inversion
    - Causes- weak myometrium, pulled too hard on uterus
        - Big risk factor- prior inversion
    - Presentation- pulling out placenta, see a bluish bulge from the vagina
    - Tx - replace uterus, give IV oxytocin to contract it back into place
- PPH treatments when all else fails
    - Ligate uterine arteries, internal iliacs
    - All else fails- hysterectomy
- Complications
    - Sheehan’s syndrome vs apoplexy
        - Apoplexy- think of it as a hemorrhagic stroke of the pituitary
        - Sheehan’s- ischemic pituitary stroke

Menorrhagia

- PALM COEIN- Structural vs non structural causes of uterine bleeding (can cause IDA!)
    - structural
        - Polyps
        - Adenomyosis
            - Symmetric, painful, soft
        - Leiomyomas = fibroids
            - Presents as asymmetric nodularity of the uterus. Usually painless, firm.
            - Can be palpable on physical exam, can detect on a transvaginal u/s
            - Tx- OCp to regulate the HPG axis, NSAIDS if painful
            - If this lady wants to get pregnant in the future, perform a myomectomy. If she is postmenopausal, can perform a hysterectomy
                - Before surgery, you can give continuous Leuprolide to shrink the tumors- they are estrogen responsive
            - Can give tranexamic acid - helps to bleed less
        - Malignancy and hyperplasia
    - Non structural
        - Ccoagulopathy
        - Ovulatory dysfunction (PCOS)
        - Endometrial causes

    - Iatrogenic
    - Not yet defined
- Other alphabet soup
  - Metrorhagia- bleeding between periods
    - Think of a metro bus coming more often
  - Polymenorrhea- bleeding occurs <21 days apart
  - Oligomennorhea- bleeding occurs > 35 days apart
  - Hypomennorhea- regularly times menses with very light flow
  - Menometrorrhagia- heavy bleeding at irregularly timed intervals
- Life threatening hemorrhage
  - Type and cross, 2 large bore IVs, IVF, transfuse as needed
  - IV estrogen is first line
  - Consult OBGYN

Q18
27 y/o G0P0. annual gyn exam. no abnormal pap smears. Over the past decade, she has had irregular periods. Married for past 3 years. Unprotected intercourse every other day, has not become pregnant. Physical shows male pattern hair growth around chin, no evidence of clitoromegaly. BMI 35. BP 150/102. Requests referral to dermatologist for long standing hyperpigmentation under breast and axilla since 6 months ago = PCOS

- Dx PCOS is clinical. Need 2/3 criteria- 1. Polycystic ovaries on u/s 2. Evidence of hyperandrogenism (hirsut). 3. Need objective sign of anovulation/ can also see insulin resistance, LH:FSH ratio elevated- not required for sx, but supportive.
- r/o other causes of hyperandrogenism
- Tx
  - Clomiphene- an ER partial agonist.-> shut down estrogen negative feedback-> This can increase GnRH-> encourage ovulation and fertility
  - OCP
    - regulates HPG axis
    - Estrogen can increase synthesis of Sex hormone binding globulin (SHBG)-> binds testosterone!-> decrease testosterone levels, decreasing hirsut sx!!
  - Spironolactone
    - Helps with hyperandrogenism
    - Helps with hirsut- inhibits 5a reductase (testosterone-> DHT) in the skin
  - Metformin + LSM for insulin resistance
- Longstanding PCOS complications
  - Metabolic syndrome antecedents (stroke, MI)
  - Infertility (this is the most common cause of infertility due to ovulatory factors)
  - Endometrial hyperplasia/cancer
    - If you see a 39 y/o lady with abnormal bleeding and 5 y history of PCOS- think about getting an endometrial bx!!

Postmenopausal bleeding from the vagina- think of endometrial cancer. NBSIM - endometrial biopsy.

Q19

32 presents to L&D at 37 weeks gestation with consistent moderately painful uterine contractions. Pregnancy is complicated by hx diabetes. FHR normal. Offered elective c section due to macrosomia, but she insisted on having a natural birth. During second stage of labor, baby's anterior shoulder is stuck under the pubic symphysis, the baby is successfully delivered after repeated traction on the shoulder and arm, and maternal maneuvers i.e. hip flexion. This increases risk of injury to = C5-C6 roots of the brachial plexus (erb duchenne palsy)

- Waiters tip deformity- kids hand is pronated, elbow extended, wrist is flexed
  - Dont confuse with klumpke's palsy- this is C8-T1
- Shoulder dystocia- is an obstetric emergency (fetal hypoxia)
- Manuevers
  - Apply suprapubic pressure
  - Mcrobert's maneuver = flex hips
  - Mom on all fours
  - Zavanelli maneuver if all else fails- push the child back into the uterus and do a c section

FHR tracings

- HR
  - Normal- 110-160
  - <110 = fetal bradycardia
  - >160 = fetal tachycardia
- Accelerations
  - Rise in HR of 15 BPM for at least 15 seconds
  - 2 of these in a 20 min period = positive NonStress Test -> expectantly manage
    - Absence of this-> proceed to Biophysical Profile
      - 5 components- NST, amniotic fluid index (5-25), breathing, movement, tone. Each is 2 points.
        - Score of around 4- bad sign, thinking about delivery of some sort
- Variability
  - The squiggles- should be present
- Abnormal tracings- refer to vodcast
  - Early decel- not normal, but its benign. Gradual decrease and increase of FHR, in phase with maternal contraction. Caused by head compression. Reassuring tracing
  - Variable decel- is a more abrupt change of FHR. caused by umbilical cord compression. Non reassuring tracing, may want to deliver
  - Late decel- gradual downslope and increase of FHR that is out of phase with maternal contractions- caused by Uteroplacental insufficiency
    - NBSIM- increase perfusion of placenta-> mom in LLB position
      - Deliver soon
  - If you think a FHR tracing is abnormal, first determine if it is an abrupt change or not (is most likely variable). If it is gradual, ask if it is in phase with maternal contraction. In phase = early decel, not in phase = late decel
  - Sinusoidal wave = fetal anemia
    - May want to do PUBS to check for anemia, can also transfuse with PUBS1
  - VEAL CHOP

Variable decel	Cord compression
Early decel	Head compression
Accelerations	O for nothing
Late decels	uteroPlacental insufficiency

-

Q24

15 y/o primigravida complains of severe morning sickness and vagina bleeding. Vomiting for hourse every day, has lost 15 lb since LMP 8 weeks ago. Is taking benadryl to help with the nausea. BP is 140/98, RR is 18, HR is 103. TVUS reveals central heterogenous mass in the uterus. Having a solid hyperechoic area interspersed with a multitude of cystic areas. BHcg is positive. NBSIM = suction curretage (molar pregnancy/hydatidiform mole)

- solid hyperechoic area interspersed with a multitude of cystic areas = snowstorm appearance
- Partial mole
    - 2 sperm fertilize 1 egg (triploid). Has some fetal tissue. Less Bhcg than complete moles. Could theoretically progress to choriocarcinoma, but lesser risk than complete mole.
- Complete mole
    - 2 sperm fertilize an empty egg, or 1 sperm fertilizes an empty egg and duplicates its genetic material. diploid
    - No fetal tissue. Produces a lot more bhcg. Much more likely to progress to choriocarcinoma.
- Moles- See size-dates discrepancy, hyperemesis gravidarum.
    - Hyperemesis gravidarum is due to BHcg!
    - Patient should be on birth control for 6 month- want to see Bhcg go to 0 to ensure no recurrence.

Psammomma bodies- can be described as laminating calcficications

- Assoc with papillary thyroid cancer, meningioma (assoc with neurofibromatosis, around falx cerebri), serous cystadenoma/carcinoma

Q25

2 months after a suction curretage, the patient begins to have vaginal bleeding, SOB, and very high bhcg-NBSIM = CXR. this is choriocarcinoma. Most common area of mets = lungs, then brain

- Tx- methotrexate- dihydrofolate reductase inhibitor.
    - Side effect- severe bone marrow suppression- add leucovorin, a folinic acid analog
    - f/u- birth control for 1 year so that we can detect recurrence
- Choriocarcinoma can present as hyperthyroidism bc BHcg and TSH share a common alpha subunit, along with FSH/LH. TSH will be low, thyroid hormone levels will be high

Q26

29 y/o G2P1 female presents for first prenatal visit at 10w gestation. RhD negative. Anti immune globulin is negative. NBSIM- give RhD immune globulin at 28 w

- If pt was instead having a + RhD immune globulin titer- NBSIM = check Rh- status
    - If dad is RhD negative, baby can not be Rh +, nothing to worry about.
    - If dad is RhD pos/unk

        - Check for fetal anemia by checking doppler u/s of middle cerebral artery of the fetus- baby is hypoxic, and tries to combat this by increasing cardiac output. if you have increased flow in the middle cerebral artery, you should be worried about fetal anemia.
            - Can do PUBS and transfuse

Q27

35 y/o female with hx of 4 c sections presents with painless vaginal bleeding at 32 w gestation. NBSIM- u/s first. If you did a vaginal exam first, you are at risk of worsening the bleeding.

- Placental previa- is likely in the setting of many c sections bc of the increased amounts of scar tissue- this is the #1 RF
    - If you detected it at 30/31 weeks- do NOT need to proceed to delivery now bc placental location can change!
        - Pelvic rest (stop having sex), give steroids, Mg if <32w to protect ag cerebral palsy (neuroprotection)
    - If you detected it at 36 ish weeks, plan a c section. Dont want vaginal delivery with possible life threatening bleeding.

Q28

37 y/o G2P1 with prior hx c sections has severe bleeding after the second stage of labor, ultimately requiring a hysterectomy. Intraop evaluation of the uterus reveals an

- adherence of the placenta to the myometrium = accreta
- Invasion of the placenta in the myometrium = increta
- Invasion of bladder = percreta

23 y/o G2P1 rushed to the OR after FHR revealed multiple persistent late decels, her pregnancy has been uncomplicated. The OBGYN resident noticed severe vaginal bleeding after membranes were ruptured = vasa previa. Do crash c section.

Q29

- 32y/o G2P1 at 34 w gestation is the only survivor of an MVA. she is brought to the ED. she complains of abdominal pain. Trans abdominal u/s is unremarkable. Pelvic exam reveals blood emanating from the cervical OS. hx poorly controlled BPs, heavy cocaine use. Last OBGYN visit was at 10 w gestation = abruptio placentae. Do an emergency c section
- 25 y/o G2P1 at 38 w gestation has been on L&D for the past 24 hours after her water broke. Microscopic eval of vaginal fluid has a ferning pattern. Pt has no uterine contractions. = Premature rupture of membranes and prolonged ROM. give oxytocin to help mum along.
- More alphabet soup
    - Normal ROM- first contractions, then ROM, then see positive ferning on microscopy of vaginal fuid or confirm w nitrazine
    - PROM- premature rupture of membranes- membrane ruptures before contractions start
    - PPROM - preterm premature ROM- <37w preg.
    - PPPROM - prolonged preterm premature ROM. PPROM when the water has been broken for an >24h , (text book definitions differ on exact amount of hours).
        - Give mom ampicillin or penicillin for the prolonged rupture of membranes to prevent GBS
        - <34 weeks give dexamethasone to promote fetal lung maturity

    - <32 weeks give Mg to decrease risk of fetal cerebral palsy
- Fibronectin test “in two weeks baby will come”, good negative predictive value for preterm labor
- Cant delay preterm labor for more than 24-48 hrs. Give mom steroids, Mg, tocolyse w terbutaline (b2 agonist) cAMP goes up in smooth muscle causing relaxation bcof inhibiting myosin light chain kinase
  - Mg is NOT a preferred tocolytic
  - No indomethacin after 32 weeks
- Bacterial Vaginosis, multiple pregnancies, and prior hx of preterm labor all increases risk of preterm labor
  - Also having a bicornuate uterus bc paramesonephric ducts didnt fuse

Q30
hypoplastic fetal lungs + amniotic fluid index <2cm + facial, skin, and limb defects =
Potter Sequence arises secondary to bilateral renal agenesis leading to oligohydramnios

Oligohydramnios can also be described as a newborn with fullness in suprapubic area, think posterior urethral valves
Polyhydramnios: anencephaly, neural tube defect, mom didnt take enough folate, maternal diabetes, duodenal atresia, esophageal atresia (think VACTERL)

> Maternal Diabetes: If baby is hyperglycemic, filters more sugar at the level of glomerulus leads to fetal polyuria leads to polyhydramnios
> Duodenal Atresia: double bubble, hx of down syndrome

Q31
Mom’s size>date + Quad screen high AFP and B-hcg+ splitting of embryo on day 10 after fertilization + 2 babies are born, one anemic and SGA other baby is polycythemic, volume overloaded and has signs of heart failure=

Twin Twin Transfusion. Monochorionic, diamniotic. Know these on Ultrasound
Earlier split of embryo (days 0-4) dichorionic diamniotic, day (4-8) **m**onochronic **d**iamniotic (MD), day 9-12 monochorionic, monoamniotic, day 13+ conjoined twins monochorionic, monoamniotic.

Q32
22yo lower abdominal pain and vaginal bleeding. LMP 7 weeks ago, PMHx of PID. smokes a pack of cigs a day. ---> ectopic pregnancy
Risk Factors: PID: scarred fallopian tubes. Smoking: decreased motility of fimbriae of oviduct Hx of tubal ligation: not 100% effective. Prior Hx of ectopic
Most common location of an ectopic is in ampulla of fallopian tube

If hemodynamically unstable w ectopic→ proceed to surgery
If hemodynamically stable and beta-hcg is <5000 → give methotrexate AVOID if bad kidneys or liver in mom
Hemodynamically stable, you suspect an ectopic pregnancy, beta hcg + (<1500) → may not see a gestational sac on ultrasound. You should recheck in two days. If beta hcg has doubled (or more) in those two days that is a good sign for an intrauterine pregnancy (get an U/S) to confirm
If beta hcg >1500 but you dont see a gestational sac, this is diagnostic of an ectopic pregnancy.

Q33 Spontaneous Abortion

Vaginal bleeding, closed os, viable fetus on ultrasound: threatened abortion
Vaginal bleeding, closed cervical os, no viable fetus on u/s: missed abortion
Vaginal bleeding, open cervical os, intact gestational sac on u/s: inevitable abortion
Vaginal bleeding, open cervical os, some products of conception visible on u/s: incomplete abortion
Vaginal bleeding, open/dilated cervical os, no products of conception visible on u/s; complete abortion

<20 weeks, perform a D&C, can also use uterotonic like oxytocin
ethics : be supportive and empathetic, but need to get the baby out SOON
Septic abortion: give broad spectrum antibiotics, perform urgent D&C

>20weeks its called Intrauterine Fetal Demise. In general, dont perform a D&C on these, perform a dilation and evacuation. NO C Section

painless, 2nd trimester losses from cervical insufficiency-->think about placing a cerclage
    Contraindication to exercise
    Classic Hx: previous LEEP procedure

Q34 What is the most likely bug?

1. Chorioretinitis, hydrocephalus, intracranial calcifications, cat litter, give folate inhibitors (pyrimethamine/sulfadiazine) = Toxoplasmosis (if mom has infection in pregnancy, give spiramycin)
2. Slapped cheek rash, arthritis in adults, anemia +/- fetal hydrops → Parvovirus B19 (single stranded DNA virus, slapped cheek rash) infects erythroid precursor cells
3. Fetus born with scarred skin, hypoplastic limbs, life threatening pneumonia, mom had a generalized, vesicular, blistering rash in different stages of healing during pregnancy → Herpes 3 VZV (potentially give acyclovir)
4. Mom consumes deli meats/soft cheeses, stillborn fetus, abscesses in hear, liver, spleen, give ampicillin→ Listeria (granulomatosis infantiseptica)
5. Cataracts, deafness, machine like murmur in a newborn w blueberry muffin rash → Rubella
6. **Periventricular calcifications** in the fetus, sensorineural hearing loss with jaundice, hepatosplenomegaly → CMV
7. Prevent infection by a scheduled C section, give AZT during intrapartum period → HIV
8. Give acyclovir prophylaxis starting at 36 weeks if infection with → HSV.
    a. Visible herpes lesions on vagina→ C section
    b. No visible lesions → vaginal delivery
9. Sloughed skin of hands and feet, nasal secretions in neonate, later in life kid has a prominent forehead, collapsed nasal bridge, Hutchison teeth, and anterior tibial bowing → Syphilis. Snuffles in newborn* wear gloves when touching snuffles.
    a. If mom has syphilis in pregnancy but is penicillin allergic… give PENICILLIN. De-sensitize mom.
10. Cause of a notable infection in first 28 days of life → GBS (S. agalactiae)

Q35

1. 67yo female presents with a 1yr history of anogenital pruritus, exam reveals large, ivory white patches on the vulva with extension to the perineum. What is the next best step in management?
   Get a biopsy. Most likely lichen sclerosus, but could be cancer. Treat lichen sclerosus with a steroid like clobetasol
2. 60yoF presents with a large adnexal mass that is resected. A pathological specimen reveals psammoma bodies (lamellated calcifications) → serous cystadenocarcinoma
3. 39yoF 1 yr hx of severe adnexal pain for several days during her menstrual cycle, diagnostic laparoscopy revels what appears to be walled off “dark brown” material → endometrioma (chocolate cyst)
4. 15yoF presents to the ED with severe, sudden onset abdominal pain, a large mass was palpated in the abdomen by her OBGYN 2 yrs earlier, resection biopsy reveals teeth and hair → dermoid cyst. Teratomas present as anterior mediastinal masses contrast with neural tumors like a neuroblastoma that tends to present in the posterior mediastinum
5. 10yoF is being evaluated for precocious puberty. u/s reveals an ovarian mass (may present with Call Exner bodies) → granulosa cell tumor tumor marker is estrogen
6. 10yoF is being evaluated for virilization, ovarian mass on u/s, testosterone is 10x the upper limit of normal→ leydig cell tumor
7. Early menarche, nulliparity, and late menopause (increase or decrease) the risk of ovarian cancer? More cycles,increases risk of ovarian cancer.
8. Tumor markers for yolk sac tumors? AFP (and hepatocellular carcinoma)
   a. Choriocarcinoma? Beta hcg
   b. Granulosa cell? Estrogen

Q36

44yoF schedules an appt with her Gyn 3 months after her annual checkup. She has felt irritable and moody for the past 9 weeks and often has to change her nightgown as a result of severe night sweats. Physical exam is notable for mild pretibial edema. Vitals are notable for mild tachypnea. The patient is in a good relationship with her husband of 20 years. She has regular, 30 day menstrual cycles although she has recorded no flow for the past two cycles. What is the next best step in management?

Measure serum beta hcg. She may be pregnant!!

Male and Female Sexual Development

Male, XY, Y chromosome has sex determining region, results in formation of testes. Testes contain two cells, one of which is the Leydig cell that produces Testosterone. Testosterone can be converted to DHT by 5 alpha reductase. DHT virilizing the external genitalia. Testosterone is a “survival factor” for the Wolffian Duct. Testosterone thus promotes differentiation of epididymis, vas deferens and seminal vesicles. The second kind of cell in the testes is the Sertoli cell that produces MIH, mullerian inhibiting hormone. Recall mullerian duct is NOT a precursor to ovaries, mullerian duct will eventually form the uterus, upper ⅓ of vagina, and fallopian tubes.

Sertoli cells also produce inhibin which acts as a negative feedback mechanism on the anterior pituitary decreasing the release of FSH.

Q37 Primary Amenorrhea- 13yo no secondary sex characterisitics or 16yo with secondary sexual characteristics with no menses

- 20yoF has breasts and a uterus. All levels of hormones are normal → imperforate hymen (some kind of obstruction
- 20yoF model or hardcore athlete has breasts and a uterus. What would be true of her hormone levels? All low hypogonadotropic hypogonadism
- 20yoF breasts, no uterus, testosterone levels are high. → Androgen Insensitivity Syndrome
- 20yF, breasts, no uterus, karyotype reveals 46 XX → mullerian agenesis. MRKH
- 20yoF, no breasts, has a uterus, cant smell→ kallman syndrome hypogonadotropic hypogonadism as well
- 20yoF, 3’ 5” tall, low posterior hairline, widely spaced nipples, high blood pressure in arms, low blood pressure in legs, no breasts, has a uterus→ turner syndrome. No breasts bc low estrogen (bc of streak ovaries)
- 20yoF, uterus, no breasts, visual field defects → hyperprolactinemia or craniopharyngioma

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Ep. 26: USMLE Radiology

Slides

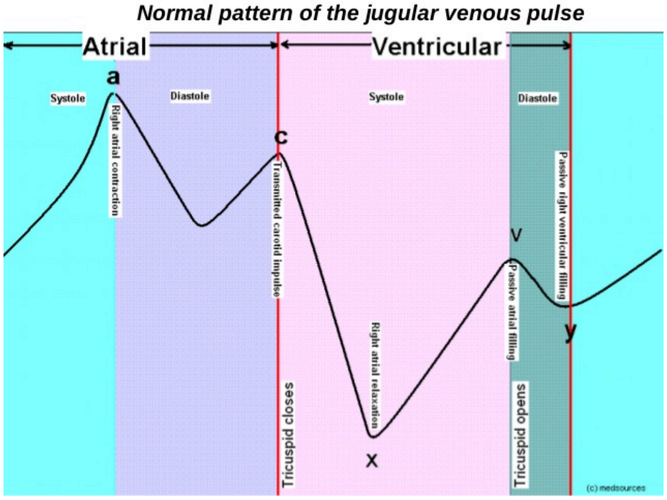
- **Bamboo Spine:** Ankylosing spondylitis: HLA-B27 Pos + assoc with sacroiliitis
- **Apple core lesion**: Colon cancer 55 yo M with heme stools with Hb of 6.9
    - IDA in pt > 50 - colonoscopy
- **Bird’s beak** : Achalasia – dysphagia to solids and liquids
- **Boot heart:** TOF – child born with hypocalcemic seizures. Assoc with down syndrome and Digeorge
- **Sunburst/ Codman’s triangle** : osteosarcoma child with white reflex at birth (assoc with Rb)
- **Sail sign** in anterior mediastinum in newborn : thymic shadow (absent in SCID , Digeorge)
- **Steeple sign** = croup (stridor). Subglottic stenosis. Parainfluenza.
- **Thumb sign** = epiglottitis. Supraglottic stenosis. H flu type B. next step: intubate
- **String sign** = Crohn’s. Terminal ileum impacted. B12 def/ megaloblastic anemia.
- **Target sign**: Intussusception Red currant jelly stools in kid. Avoid rotavirus vaccine.
    - Currant jelly sputum in alcoholic = klebsiella
- **Target sign (2):** Pyloric stenosis: nonbilious vomiting in newborn taking erythromycin
- **Coin lesion:** lung malignancy. 12-200 pack year smoking history
- **Leather Water bottle stomach:** Linctus plastic – diffuse gastric cancer. Assoc with h. pylori and with E-cadherin mutations.
    - 13-50 lb weight loss in a 6 month period
    - Histo – signet ring cells

- **Water bottle heart:** pericardial effusion. Can cause cardiac tamponade (becks triad), electrical alternans/ low voltage ekg.
- **Coffee bean** = sigmoid volvulus. Severe abd pain and constipation
- **Onion skin :** Ewing sarcoma (11;22) 12 yo with 2 mo hx of fevers and leg pain. Tx w/ dactinomycin
- **Double bubble:** Duodenal atresia. This child has a history of Tri 21 + Bilious vomiting
    - Bilious = (stenosis distal sphincter of oddi)
    - Other HY t21 assoc: VSD, atlantoaxial instability (get lateral neck xray before sports), Alzheimer's, Hirschsprung
- **Blueberry/ Berry sign**: Berry aneurysm: Nasty headache in a patient with a hx of ADPKD. Most common location AComm > Pcomm.
- **Grape sign:** Hydatidiform mole: severe hyperemesis gravidarum. Increased B-hcg → hyperemesis
- **Snowstorm appearance:** Hydatidiform mole or molar pregnancy
- **Batwing:** in pt with hx of CF: pulm edema
- **Butterfly:** GBM: Severe headache over the past 6 mo. Type IV astrocytoma crossing corpus callosum. Central. necrosis and edema Tumor marker: GFAP.
- **Lead pipe colon**: Ulcerative colitis: hint: also has a hx of Primary Sclerosing Cholangitis. Loss of haustral markings
- **Box heart:** Ebstein's anomaly (+mom took lithium when she was pregnant for BPD). Buzzword atrialization of right ventricle
- **Corkscrew esoph**: diffuse esophageal spasm. Chest pain relief with nitroglycerin. Tx with nitrates or CCB. Intermittent dysphagia to solids and liquids
- **Egg on a string:** TotGV: single s2. Newborn with cyanosis.
- **Honeycomb lung:** IPF: 65 y/o M with 6 mo history of exercise intolerance: DLCo Dec.
    - Reticular opacities, ground glass opacities and honeycombing
- **Whirlpool spin:** midgut volvulus. 3 month old with bilious vomiting.
- **3 sign:** COTA. EG: Pt has history of turner's syndrome. High BP in arms and no pulse in legs.
- **Snowman sign**: TAPVR. Pulm veins drain into RA. newborn with cyanosis.
- **Signet Ring sign in lung:** bronchiectasis. (pt may have hx of cystic fibrosis or ciliary dyskinesia)
- **Rachitic Rosary**: Rickets> elevated PTH low CA and low Phosphate. Vitamin D def (secondary hyperparathyroidism)
- **Pencil and cup deformity:** psoriatic arthritis. Seronegative spondyloarthropathies.
- **Ladder of GI tract:** SBO can also be in LBO but classic for SBO
- **White out lung**: ARDS . ICU pt on vent. Noncardiogenic pulm edema so PCWP <18. Tx with low TV and high PEEP
- **Ground glass opacities in the lung in preemie:** Neonatal respiratory distress syndrome. Premie with Lecithin/sphingomyelin = 1
- **Bowel in thoracic cavity:** congenital diaphragmatic hernia. Scaffold abdomen. Newborn with severe resp distress at birth. Kid will have lung hypoplasia.
- **NGT curling in upper thorax:** esoph atresia with TE Fistula . MC is H type. Assoc with VACTERL. KNOW VACTERL and CHARGE.
- **Interstitial infiltrates** in pt with CD4<200**:** PCP Give IV Bactrim, if not a choice possibly pentamidine.
    - Know criteria for steroids: Aa gradient> 35 or O2 <92% or PaO2 < 70 to avoid hypoxic respiratory failure

Cross checked: Yes

Ep. 29: Comprehensive Medicine Shelf Review Session 1

- **Opening snap** + **diastolic rumble at left 4th interspace** + **tall jugular venous A-waves.** Murmur? tricuspid stenosis
  - **Note**: “Tall Jugular Venous A-waves” = JVD
    - A-waves = atrial contraction
      - Contraction against increased resistance = taller A waves


Normal pattern of the jugular venous pulse
Atrial
Ventricular
a
Systole
Diastole
Right atrial contraction
c
Transmitted carotid impulse
Systole
Diastole
Passive right ventricular filling
v
Passive atrial filling
y
Right atrial relaxation
x
Tricuspid closes
Tricuspid opens
(c) medsources

- What increases the intensity of tricuspid stenosis? Leg raise, IVF, Inspiration (increased preload)

- What decreases the intensity of tricuspid stenosis? (increased afterload; less blood flow across valve)

- **Elevated AST/ALT** + **blistering lesions** on dorsum of hands + **hirsutism**. → porphyria cutanea tarda
  - Deficiency enzyme? UROD (uroporphyrinogen decarboxylase)
  - Tx? Phlebotomy

- **Hypoglycemia** + **hypoglycemia sxs** + resolution w/ glucose administration. → **Insulinoma**
  - These 3 symptoms together = Whipple’s triad

- DDx 3 major etiologies of hypoglycemia
  - Insulinoma = ↑Insulin + ↑C-peptide + **negative** secretagogue screen

  - Exogenous insulin = ↑Insulin + ↓C-peptide + **negative** secretagogue screen

  - Sulfonylureas = ↑Insulin + ↑C-peptide + **positive** secretagogue screen

- Tx of acute hypoglycemia? juice/sugary drink (outpatient) or glucagon injection (inpatient; quickest way)

- Skin finding a/w glucagonoma → necrolytic migratory erythema

Diarrhea

- Pork consumption or new puppy + diarrhea = *Yersinia enterocolitica*
- Undercooked shellfish + diarrhea = *Vibrio parahaemolyticus* or *Vibrio vulnificus*
    - Which has worse prognosis in pt's with liver dz? *Vibrio vulnificus*
- Rice-water stools in developing country = *Vibrio cholera*
    - Tx? Oral rehydration + doxycycline
- Very small inoculum + bloody diarrhea = *Shigella*
- Eggs/poultry consumption + bloody diarrhea = *Salmonella enteritidis*
- Potato-salad consumption + watery diarrhea just hours later = *Staph aureus*
- Bloody diarrhea w/ low PLTs + unconjugated hyperbilirubinemia + SCr = *E. coli O157:H7* or *Shigella*
- Diarrhea on return from Mexico → *ETEC*
- Foul-smelling watery diarrhea after recent abx treatment → C. diff
    - 1º Prevention? Hand washing
    - Tx?
        - 1st line: Oral vancomycin or fidaxomicin
        - Last resort: fecal transplant

- Crampy abdominal pain after eating home-**canned veggies** = Botulism (*Clostridium botulinum*)
- Bloody diarrhea w/ ascending paralysis in puppy owner = GBS 2/2 *Campylobacter jejuni*
- Watery diarrhea after eating rice at Chinese restaurant = *Bacillus cereus* (Cereulide toxin)
- Empiric ABX Tx of diarrhea? Fluoroquinolones (1st-line) or macrolides

- 75 yo M + lives in home built in 1930s + Prussian blue stain shows basophilic inclusions around nucleus. Toxicity? Lead poisoning
    - Histo? Ringed sideroblasts
    - Labs? ↑Ferritin + ↓TIBC
    - Tx?
        - Succimer aka Dimercaptosuccinic acid (DMSA)
        - EDTA
        - Dimercaprol aka British anti-Lewisite (BAL)

    - What vitamin supplement to give in sideroblastic anemia? B6
        - ALAS (rate-limiting enzyme) uses B6 cofactor

- **Febrile** patient + taking **high-dose immunosuppressants** + CXR shows **diffuse bilateral ground-glass infiltrates**. → PCP pneumonia
    - Dx? BAL (broncho-alveolar lavage)
    - Relevant stain? Silver stain
    - Elevated marker from pulmonary fluid? LDH
    - PPx? TMP-SMX for CD4 < 200
        - Alternatives? Aerosolized pentamidine, dapsone, or atovaquone (clindamycin)

    - Tx? TMP-SMX
        - When to add steroids?
            - O_2 Sat < 92% aka $PaO_2 < 70$

              or
            - A-a gradient > 35

- Flank pain + gross hematuria → nephrolithiasis
    - Envelope-shaped = calcium oxalate (X in o**X**alate for X-shape of folds of letter envelope)
        - Etiologies?
                - Ethylene glycol
            - Crohn's Disease, i.e. increased reabsorption of oxalate
    - Coffin-shaped = struvite (magnesium-ammonium-phosphate)
        - A/w which bug? Proteus mirabilis (Urease-positive → makes urine alkaline → precipitates stones)
    - Hexagonal-shaped = cysteine ("**SIX**tine stones")
        - Etiology? Cystinuria
            - Pathophys? Defective COLA transporter → cannot reabsorb cysteine, ornithine, lysine, and arginine at PCT
        - Tx? Acetazolamide
            - MOA? Alkalinizes urine to solubilize the stones (cystine stones are acidic)
    - Radiolucent stones = uric acid stones (U in radiol**U**cent for U in **U**ric acid)

- What imaging to diagnose kidney stones? **CT** (1st line)
    - U/S if pregnant

- Tx for kidney stones? Fluids + tamsulosin (alpha-1 blocker)
    - For large stone? ESWL (extracorporeal shock wave lithotripsy)
    - For giant struvite stone? Nephrostomy tube to drain tube + surgery

- 24 yo M presents with painless, palpable bony mass on left knee. Knee XR reveals contiguous mushroom shaped mass. → osteochondroma
    - DDx
        - osteosarcoma = kids
        - osteoid osteoma = pain in legs at night + relieved with NSAIDs

- 66 yo F is found **unconscious** at home in **December**. PEx shows **cherry-red appearance of skin**. Toxicity? carbonic monoxide poisoning
    - Classic presentation? **HA + AMS + cherry-red lips**
    - A/w? Winter, space heaters, garage suicide
    - Pathophys?
        - CO occupies binding sites on Hgb with 200x affinity than O_2 → Leftward shift of oxyhemoglobin dissociation curve → prevents Hgb from releasing O_2
    - NBS for → Carboxyhemoglobin level
    - Tx? Hyperbaric O_2
        - Mechanism? Reduces the half-life of CO binding to Hgb
    - Neuroimaging finding? Hyperintense lesions in globus pallidus

- Elevated creatinine 24 hrs after getting a CT scan. → Contrast nephropathy
    - Prevention? Hydration + N-acetylcysteine

- What are other uses of N-acetylcysteine?
  - APAP overdose
  - Inhalation tx for CF patients (breaks disulfide bonds)
  - Hemorrhagic cystitis 2/2 cyclophosphamide – however, mesna is first-line
    - What virus causes hemorrhagic cystitis? adenovirus
    - What microbe causes hemorrhagic cystitis in pt from Egypt? Schistosoma haematobium

- Skin fibrosis after getting a brain MRI. → nephrogenic systemic fibrosis
  - Exposure? Gadolinium

- What DM medication should be held before a CT scan? Metformin
  - Why? Risk of lactic acidosis with renal dysfunction (which could happen after contrast exposure)

- What common AE is a/w hydralazine and Ca2+ channel blockers? peripheral edema
  - Pathophys? Dilation of precapillary arterioles
  - Tx? ACE-I
    - Mechanism? Dilation of post-capillary venule " decrease capillary hydrostatic pressure

- HIV patient with 3-day h/o fever + targetoid skin lesions + lip/mouth ulcers + visual impairment. PEx shows for skin sloughing (8% BSA). Positive Nikolsky sign. Started allopurinol 10 days ago for chronic gout. → SJS
  - NBS? Stop the drug
  - What Dx if there is > 30% BSA involvement? TEN

- 30 yo F presents with 3-day hx of polydipsia and polyuria. Blood glucose is 650 mg/dl, Bicarb is 21, pH is 7.35. → HHNS (Hyperglycaemic hyperosmolar non-ketotic syndrome)
  - A/w T2DM; normal pH; no ketosis
    - Why no ketosis in HHS? B/c T2DM pt's still make insulin, which inhibits glucagon and thus prevents DKA
    - In contrast: DKA is a/w T1DM and causes low pH & ketosis
  - Tx? Fluids + insulin
  - Na+ balance? Hyperosmolar hyponatremia
    - Na correction: add 1.6 for every extra 100 of glucose
      - E.g. glucose of 900 → add 1.6*8 = 12.8
  - K+ balance?
    - Serum K+ high
    - Total body K+ low

- Patient with HHNS receives rapid tx and becomes altered/comatose. What happened? Cerebral edema 2/2 rapid lowering of glucose

- 49 yo F presents with wheezing and flushing. PE is +ve for murmurs consistent with tricuspid regurgitation and pulmonic stenosis. → carcinoid syndrome
  - "**Be FDR**" **= bronchospasm + flushing + diarrhea + R-sided heart lesions**
    - R-sided heart lesions = "TIPS" = tricuspid insufficiency + pulmonary stenosis
  - Why R-sided heart lesions? Lungs metabolize serotonin
  - Dx? urine 5-HIAA (metabolite of serotonin)
    - NBSIM if positive 5-HIAA? Abdominal CT

        - NBSIM if no tumor found on CT? octreotide scintigraphy
    - Tx? Can use octreotide to reduce sxs
    - **Note**: Only have symptoms if tumor metastasizes to liver (liver metabolizes serotonin)
        - No symptoms if carcinoid tumor is localized to GI tract (e.g. appendix)

- Vit deficiency a/w carcinoid syndrome? Niacin (B3) deficiency → results in pellagra (diarrhea, dermatitis + dementia + death)
    - Pathophys? Tryptophan = precursor to serotonin and niacin. Carcinoid tumors use up tryptophan for production of serotonin → results in niacin deficiency

- Thyroid tumor that causes diarrhea? Medullary thyroid cancer (calcitonin causes diarrhea)

- 61 yo M + exertional dyspnea + Hct of 27%. NBSIM? Colonoscopy to r/o colon cancer
    - Iron studies? ↓Ferritin low + ↑TIBC + ↓Transferrin Saturation
    - When is transfusion indicated? Hgb < 7

- 61 yo M + exertional dyspnea + Hct of 27%. similar presentation + difficulty swallowing Plummer-Vinson syndrome
        - Triad = IDA + esophageal webs + atrophic glossitis (smooth red tongue)

- 29 yo F with recent trip to India (ate local foods). Returned 2 weeks ago and initially had fevers for 1 week. Now has severe abdominal pain and distension. PEx is notable for salmon colored circular lesions on the trunk. → Typhoid fever
    - Bug? Salmonella typhi
    - Tx? Flouroquinolones

- Septic arthritis
    - NBSIM? Arthrocentesis
        - WBC count in joint fluid? >50k
    - Tx? Joint washout + abx
        - Tx for gonococcal arthritis? Ceftriaxone + doxy/azithro
    - MCC septic arthritis? Staph aureus
    - MCC sickle cell pt? Salmonella
    - MCC young F with purpuric skin lesions? NG

- Difference in Tx for Chamydia Trochomatis vs Neisseria Gonorrhoeae?
    - CT: only azithro or doxy
    - NG: ceftriaxone + azithro/doxy (treat empirically for *Chlamydia*)

- Pt with subconjunctival hemorrhage + nasty coughing episodes or post-tussive vomiting. → Pertussis
    - Tx? Macrolide
    - Ppx for close contacts? Macrolide
    - Lab findings? Elevated lymphocytes

- Pt recently started Ramipril for HTN and developed cough. NBSIM? Switch to ARB

- Uniformly prolonged PR interval without dropped QRS = 1st degree AV block
    - Tx? nothing!

- Progressive PR prolongation + dropped QRS = Wenckebach aka Type I 2º AV Block
    - "Longer longer longer drop → Wenckebach"
    - Tx? nothing!

- Fixed PR prolongation + dropped QRS → Type II 2º AV Block aka Mobitz II

- Constant P-P interval + constant R-R interval + no relation b/w P waves & QRS → 3º AV Block

- Which heart blocks that require a pacemaker?
    - Type II 2º AV Block
    - 3º AV Block

- Acute mgmt for decompensated pt w/ heart block? Transcutaneous or transvenous pacing + atropine

- Contraindicated medications in heart block?
    - Beta blockers
    - CCB (diltiazem/verapamil)
    - Digoxin (d/t muscarinic agonist activity)

- Reduced EF in patient with coarse facial features and enlarging fingers. → → acromegaly
    - Diagnostic algorithm?
        - 1st step: check IGF-1
        - 2nd step: glucose suppression test
            - Normal: glucose causes suppression of GH release
            - Failure to suppress → acromegaly
        - 3rd step: MRI
    - Tx? Transsphenoidal surgery
        - Differs from prolactinoma (usually managed medically)
        - Tx prior to surgery?
            - Octreotide
            - dopamine agonist (bromocriptine/cabergoline)
            - Pegvisomant (GH receptor antagonist)
    - MCC of death in acromegaly? HF

- Dysphagia to solids and liquids in patient with thick/thin blood smears (Giemsa stain) revealing motile parasites. → Achalasia 2/2 Chagas disease
    - Microbe? Trypanosoma cruzi
    - Dx? "BME"
        - 1st step: Barium swallow
        - 2nd step: Manometry
        - 3rd step: Endoscopy
    - Imaging Finding? +Bird's beak sign
    - Tx?
        - Dihydropyridine CCB
        - Botox injection
        - Balloon dilation
            - AE of balloon dilation? Esophageal rupture
        - Heller myotomy (cut LES muscles)
    - Manifestations of T. cruzi
        - Achalasia → megaesophagus

        - Dilated cardiomyopathy
        - Destruction of myenteric plexus → megacolon

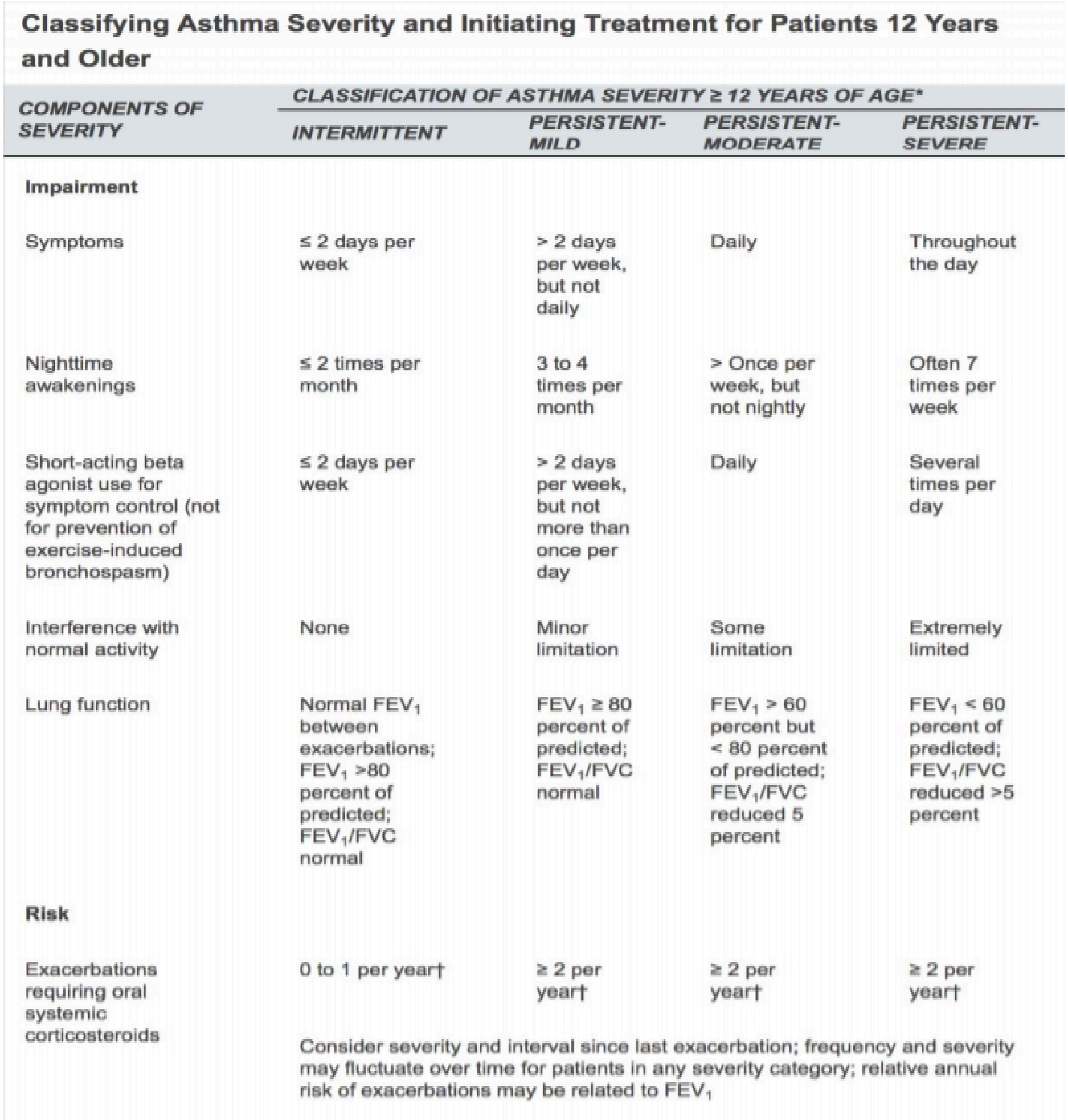
- Reduced MCV in a patient with a long history of untreated rheumatoid arthritis. → anemia of chronic disease
    - Iron studies
        - Ferritin high
        - TIBC low
        - Transferrin sat low (iron locked away in macrophages)
    - Pathophys? Hepcidin → ron sequestration by bone marrow macrophages & reduced iron export by enterocytes

- 25 yo M with nasal packing presents with a BP of 65/40, elevated Cr, respiratory distress, T of 104, and marginally elevated troponins. → Toxic shock syndrome
    - Pathophys? Superantigen production
    - Bugs? Staph aureus + Strep pyogenes
    - Tx? Fluids (+/- pressors) + abx

- Sequelae of CKD
    - Acid-base anomalies? Metabolic acidosis 2/2 H+ retention
        - Recall there's a H+ pump in the alpha-intercalated cell
    - Electrolyte anomalies?
        - Hyperkalemia
            - Pathophys? Kidneys not excreting K+ (normally happens via ROMK channel)
        - Hypocalcemia
            - Pathophys? Low 1-alpha hydroxylase → cannot make active Vit D → can't absorb Ca+ and phos from the gut
        - Hyperphosphatemia
            - Pathophys? Hypocalcemia → 2ary hyper-PTH → BUT can't excrete phos because the kidneys aren't working
            - Contrast with liver disease
                - Can't make calcidiol → 2ary hyperparathyroidism → hypercalcemia & hypophosphatemia (kidneys functional)
    - Hematologic anomalies?
        - Hgb low
            - Pathophys? Kidneys not producing erythropoietin
    - Manifestations of uremia
        - Pericarditis
        - Platelet dysfunction
            - Tx? Desmopressin
                - **Note**: Desmopressin = ADH analog → so, it can cause hyponatremia 2/2 SIADH
        - AMS
    - Tx
        - Hyperphosphatemia → phosphate binders (sevelamer)
        - Hypocalcemia → calcitriol
            - NOT calcidiol, because they can't convert calcidiol to calcitriol
    - How is kidney function preserved in diabetic nephropathy? ACE-I
    - Indications for dialysis

        - A = acidosis
        - E = electrolyte problems
        - I = ingestion
        - O = overload (fluid)
        - U = uremia

- Rb gene mutations, Paget's disease, and Teriparatide (PTH analog) administration increase risk of what primary bone malignancy? Osteosarcoma
    - Associated radiological features?
        - Codman's triangle
        - Sunburst pattern



Classifying Asthma Severity and Initiating Treatment for Patients 12 Years and Older

COMPONENTS OF SEVERITY	*CLASSIFICATION OF ASTHMA SEVERITY ≥ 12 YEARS OF AGE**			
	INTERMITTENT	*PERSISTENT-MILD*	*PERSISTENT-MODERATE*	*PERSISTENT-SEVERE*
Impairment				
Symptoms	≤ 2 days per week	> 2 days per week, but not daily	Daily	Throughout the day
Nighttime awakenings	≤ 2 times per month	3 to 4 times per month	> Once per week, but not nightly	Often 7 times per week
Short-acting beta agonist use for symptom control (not for prevention of exercise-induced bronchospasm)	≤ 2 days per week	> 2 days per week, but not more than once per day	Daily	Several times per day
Interference with normal activity	None	Minor limitation	Some limitation	Extremely limited
Lung function	Normal FEV_1 between exacerbations; FEV_1 >80 percent of predicted; FEV_1/FVC normal	$FEV_1 \geq 80$ percent of predicted; FEV_1/FVC normal	$FEV_1 > 60$ percent but < 80 percent of predicted; FEV_1/FVC reduced 5 percent	$FEV_1 < 60$ percent of predicted; FEV_1/FVC reduced >5 percent
Risk				
Exacerbations requiring oral systemic corticosteroids	0 to 1 per year†	≥ 2 per year†	≥ 2 per year†	≥ 2 per year†
	Consider severity and interval since last exacerbation; frequency and severity may fluctuate over time for patients in any severity category; relative annual risk of exacerbations may be related to FEV_1			

- Asthma step-up treatment
    - Albuterol
    - Albuterol + SABA
    - Albuterol + SABA + ICS
    - Albuterol + SABA + ICS + LABA (e.g. salmeterol)

  - Albuterol + SABA + ICS + LABA (e.g. salmeterol) + oral steroids

- Asthma + nasal polyps. → Aspirin Exacerbated Respiratory Disease
  - Pathophys?
    - Arachidonic acid → prostaglandins (COX) + leukotrienes (LOX)
    - Aspirin blocks COX → results in increased LOX pathway activity
  - Tx?
    - Leukotriene receptor (CYSLTR1) blockers, e.g. montelukast
    - LOX enzyme inhibitors, e.g. zileuton
      - AE? Hepatotoxic

- DDx for nasal polyps?
    - AERD
    - Wegener’s = GPA
    - CF

- Regular narrow-complex tachycardia. Arrythmia? SVT
  - Tx asymptomatic pt?
    - Acute SVT
      - Vagal maneuvers
      - Adenosine
    - Chronic SVT
      - Beta blocker
      - Verapamil/diltiazem
  - Tx HDUS pt? Synchronized cardioversion

- Indications for defibrillation aka unsynchronized cardioversion
  - Pulseless VTach
  - VFib

- MC EKG finding in pulmonary embolism? Sinus tachycardia

- 18 yo F with scaly, erythematous UE lesions. Long history of allergic rhinitis. → Atopic dermatitis/eczema
  - CBC finding? Elevated eosinophils
  - Tx? Topical steroids
  - What if these lesions also had umbilicated vesicles. → eczema herpeticum
    - Pathophys? HSV superinfection
    - Tx? Acyclovir

- A patient presents with classic “stones, bones, groans, and psychic overtones”. PE is notable for skin tenting. What is the first step in management? Fluids!
  - Bisphosphonates
    - Indications?
      - Osteoporosis
        - T-score cutoff? -2.5
      - Hypercalcemia of malignancy
      - Paget’s disease

        - Ppx if on oral steroids for >3 months
    - AE?
        - Esophageal irritation (prevent by sitting up for 30 minutes after taking pill)
        - Osteonecrosis of the jaw

- H. Pylori infection
  - Dx? Urea breath test or stool Ag or EGD with bx
  - Tx?
    - Triple xx = clarithromycin + amox + PPI
    - Quad therapy = metronidazole + bismuth + tetracycline + PPI (“MBTP”)
  - RF for PUD?
    - H. pylori infection
    - Chronic NSAID use

- Alpha Thalassemia:
  - Mutation in 1 alpha gene = clinically silent
  - Mutation in 2 alpha genes = alpha-thalassemia trait (asymptomatic)
  - Mutation in 3 alpha genes = Hb H disease (tetramers of beta)
    - Age at presentation? Birth (b/c alpha chains also required for HbF)
  - Mutation in 4 alpha genes = Hb Barts (tetramers of gamma)

- Beta Thalassemia:
  - Mutation in 1 beta gene = beta-thalassemia minor
    - Electrophoresis findings? Elevated HbA2
      - HbA2 = alpha2-delta2
  - Mutation in 2 beta genes = beta thalassemia
    - Electrophoresis findings? Elevated HbA2 + elevated HbF
    - Age at presentation? 6 months (b/c HbF persists until age of 6 months)

- Blood smear for thalassemias? Target cells

- Classic CBC findings in hemolytic anemias? Low haptoglobin + Indirect hyperbilirubinemia

- Classic “gallbladder” pathology for hemolytic anemia? Brown pigmented gallstones

- What microbe causes aplastic crisis in pt’s with hemolytic anemia? Parvovirus B19

- Do thalassemia’s cause microcytic, normocytic, or macrocytic anemia? Microcytic with normal RDW
  - In contrast: IDA causes microcytic anemia with high RDW

- 23 yo M with recent trip to Tucson + 2-week history of fever, ankle/knee pain, chest pain, and painful, erythematous pretibial lesion. Tx? coccidiomyocosis
  - Geographic association? Southwest U.S.
  - Derm finding? Erythema nodosum
  - Microscopy finding? Spherules
  - Tx? itraconazole

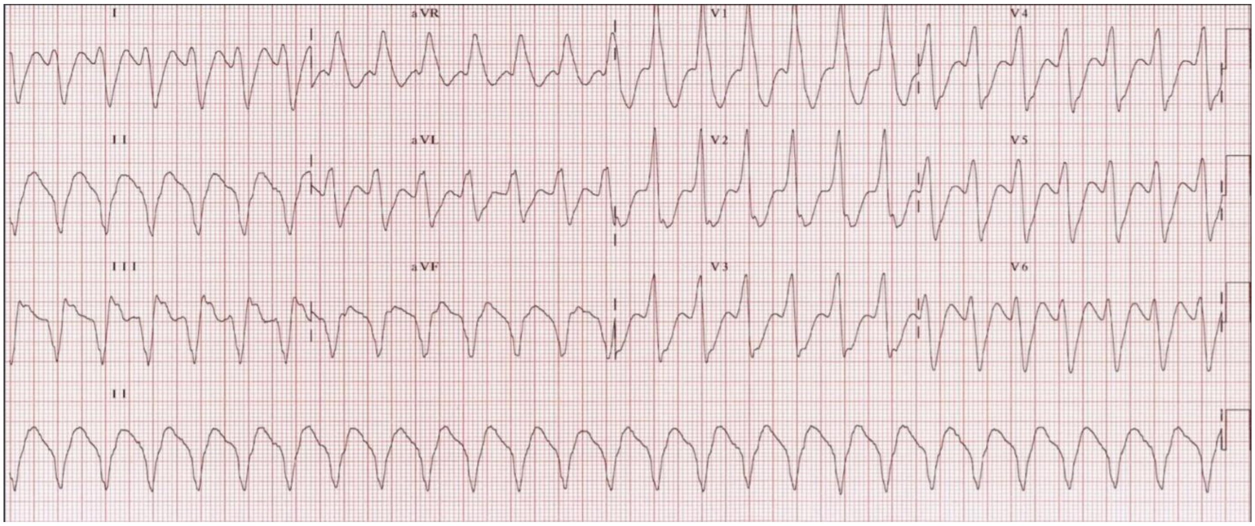
- Periorbital edema, hematuria, HTN in patient with recent cellulitis. BUN and Cr are elevated. → Post-infectious GN

- Pathophys? Nephritic syndrome
    - Ab? Anti-streptolysin-O and anti-DNase B
    - Type of HSR? Type III HSR
    - Complications of…
        - Strep pharyngitis?
            - Rheumatic fever - abx decrease risk
            - PSGN - abx have NO EFFECT on risk
        - Strep skin infection?
            - Only PSGN

- 11:22 translocation + XR shows "onion-skin-like" periosteal reaction + bone bx with histo shows small, round, blue cells. → Ewing's sarcoma
    - Tx? Actinomycin D

- Parapneumonic effusion (PNE) = pleural effusion in setting of pneumonia

● Uncomplicated PNE	● Complicated PNE	● Empyema
● pH > 7.2 ● Glucose > 60 ● LDH < ⅔ ULN ● NO bugs detected ● Tx = ABX	● pH < 7.2 ● Glucose < 60 ● LDH > ⅔ ULN ● NO bugs detected ● Tx = Abx + chest tube	● pH < 7.2 ● Glucose < 60 ● LDH > ⅔ ULN ● YES bugs are isolated ● Tx = Abx + chest tube ● VATS surgery if refractory

- 

- Arrythmia? V-Tach
    - How to describe the rhythm? Regular, wide-complex ("regular" b/c constant RR interval)
    - Tx algorithm for VTach
        - Pulseless VTach = defibrillate aka unsynchronized cardioversion
        - VTach + pulse + HDUS = synchronized cardioversion
        - VTach + pulse HDS = amiodarone

- MCC of death in first 24h after MI? VFib

    - Tx V fib = defibrillation aka unsynchronized cardioversion

- 45y M + oral mucosal ulcerations + positive Nikolsky sign. → Pemphigus vulgaris
    - “Pemphigus vulgaris is vulgar b/c it exposes what’s your skin – hence it’s +Nikolsy sign”
    - Pathophys? Autoantibodies to desmosomes (anti-desmoglein-1/-3 Ab’s)
    - Type HSR? Type II HSR
    - Diagnostic skin bx? Immunofluorescence → intraepidermal immunofluorescence (**net-like pattern**)
        - In contrast: IF of bullous pemphigoid shows a linear pattern
    - Tx? Oral steroids

- Labs in 1º hyperaldosteronism (Conn Syndrome)? ↑Aldosterone + ↓Renin + Plasma aldosterone:renin ratio >20
        - Dx? Plasma aldosterone:renin ratio >20
        - Tx? Aldosterone antagonists (spironolactone, eplerenone)

- Labs for 2º hyperaldosteronism? ↑Aldosterone high + ↑Renin
    - Clinical scenarios:
        - Young F with abdominal bruits OR resistant HTN + AV nicking. → fibromuscular dysplasia
        - Elderly man with abdominal bruits. → renal artery stenosis

- Young F with abdominal pain relieved on defecation. → IBS
    - Rome Criteria
        - Recurrent abdominal pain associated with 2 of the 3
            - Related to defecation
            - Change in stool form
            - Change in BM frequency
        - Are there lab abnormalities? NO
        - IBS Classification
            - IBS-C (constipation) → give stool softener
            - IBS-D (diarrhea) → give antidiarrheal (e.g. loperamide)

- Cold vs Warm Agglutinins
    - Cold agglutinins = IgM
        - A/w? Mycoplasma
        - Tx? Cytotoxic drug (cyclosporine, azathioprine etc)
    - Warm agglutinins = IgG
        - Tx? Splenectomy
            - Why? IgG opsonizes things and splenic macrophages clear antibody-bound RBCs → so, need to get rid of spleen

- Labs in hemolytic anemia? ↑LDH + ↑Indirect bilirubin + ↓Haptoglobin
        - Haptoglobin binds bilirubin

- 32 yo Egyptian immigrant with 2-week history of abdominal pain, hepatosplenomegaly, and hematuria. Swam in The Nile 2 months ago. → Schistosomiasis
    - Bug? Schistosoma haematobium
    - Transmission? Direct contact with water
    - CBC finding? Elevated eosinophils

  - Associated malignancy? Squamous cell carcinoma of bladder
  - Tx? Praziquantel

- Synpharyngitic glomerulonephritis aka IgA nephropathy
  - Presentation? 2-6 days after URI
    - In contrast: PIGN occurs 2-6 weeks after URI
      - Complement levels in PIGN? Low complement
  - Tx? steroids + ACEI

- Urine casts in nephritic syndromes? RBC casts

- Urine protein in nephritic syndrome ? **<** 3.5 g/24 hrs

- 70 yo M with leg pain worsened by back held in extension (better with back in flexion). → spinal stenosis
  - → MRI spine
  - Tx? Physical therapy + pain control
    - If refractory, decompressive laminectomy

- **Opening snap** with **diastolic rumble** heard best at **4th intercostal space in midclavicular line**. Valve Path? Mitral stenosis
  - #1 RF? Rheumatic fever
  - Dx? Echo
  - Tx? Valve replacement
  - MC arrhythmia a/w mitral stenosis? AFib

- Diagnostic test for all murmurs? Echo

- MC arrhythmia a/w Graves disease? AFib

- MC arrhythmia a/w hyperthyroidism? AFib

- MC comorbidity a/w AFib? Chronic HTN (Per UW 2021)

- No oral mucosal lesions + pruritus + tense blisters + negative Nikolsky sign. → Bullous pemphigoid
  - Pathophys? Hemidesmosome Ab's
  - → Skin bx w/ immunofluorescence → linear subepidermal pattern (**linear pattern**)
    Tx? Topical steroids

- 69 yo M with fever + leukocytosis + LLQ pain. → diverticulitis
  - Pathophys? Inflammation of diverticula
  - Dx? CT abdomen
  - Contraindicated imaging? Colonoscopy is contraindicated!

- 2 Tx cocktails for GI infections?
  - Cipro (GNRs) + metronidazole (anaerobes)
  - Metronidazole + amoxicillin + gentamicin ("MAG")
    - **Note**: Never choose Pip-Tazo for GI infections (too broad)

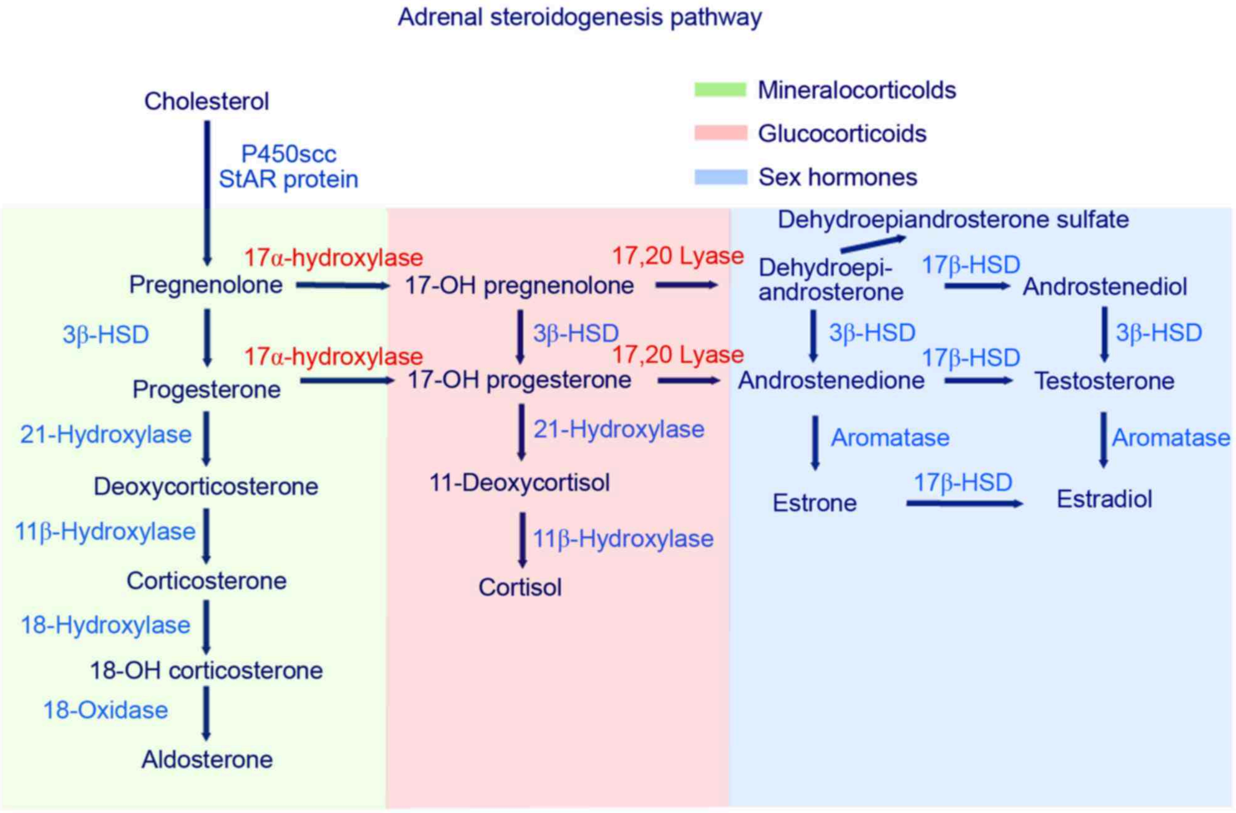
- Pt treated for diverticulitis presents with recurrent UTIs weeks later + UA shows air & fecal material. → Colovesical fistula
    - Dx? CT scan with oral and rectal contrast

  Cross checked: Yes

Ep. 30: Comprehensive Medicine Shelf Review Session 2.

- Primary adrenal insufficiency = problem at level of adrenal glands
    - Causes? Addison's disease
    - Pathophys? Autoimmune destruction of the adrenal glands
    - Associated with hyperpigmentation
        - POMC is precursor to both ACTH and MSH
        - PAI → lack of negative feedback → high ACTH
    - Lab findings?
        - ACTH high
        - Aldosterone low
            - Destruction of zona glomerulosa
        - Renin high
            - Hypotension → RAAS activation
        - Electrolytes
            - Na+ low, K+ high
        - CBC
            - Eosinophils high
                - Pathophys? Glucocorticoids → eosinophil apoptosis. Lack of glucocorticoids cause eosinophilia.
    - Dx? Cosyntropin testing → no rise in cortisol
        - Adrenal glands aren't working, so no response to ACTH.
    - Tx? prednisone/hydrocortisone/dexamethasone + fludrocortisone (mineralocorticoid)
        - Stress-dose steroids for surgery, serious illness, etc.
- Secondary adrenal insufficiency = problem at level of pituitary, reduced ACTH release
    - Causes?
        - MC is prolonged steroid use → ACTH suppression
        - Sheehan's syndrome (infarction of pituitary)
        - Pituitary tumors (ACTH-producing tumor)
    - Lab findings?
        - ACTH low
            - Anterior pituitary is being inhibited
        - Aldosterone normal
            - Zona glomerulosa under control of RAAS system
        - Renin normal
        - Electrolytes
            - Na+ & K+ unaffected (Aldosterone levels are normal)

        - CBC
            - Neutrophilia due to demargination (if pt was recently taking steroids)
    - Dx? Cosyntropin testing → rise in cortisol
        - Adrenal gland is functional
    - Tx? Glucocorticoids
        - Do not need to replace mineralocorticoids since adrenals are functional and aldosterone is under RAAS control
        - Stress-dose steroids for surgery, serious illness, etc.
- AI with a history of nuchal rigidity and purpuric skin lesions → Waterhouse-Friedrichson syndrome
    - Pathophys? AI 2/2 hemorrhagic infarction of the adrenal glands in the context of Neisseria meningitidis infection
- Adrenal synthesis enzymes
    - If the enzyme starts with 1 → HTN (high mineralocorticoids)
    - If the second # is 1 → virilization (high androgens)
    - E.g. 11-beta hydroxylase deficiency → HTN & virilization
    - E.g. 21 hydroxylase deficiency → virilization only
    - E.g. 17-alpha hydroxylase deficiency → HTN only


Adrenal steroidogenesis pathway
🟩 Mineralocorticoids
🟥 Glucocorticoids
🟦 Sex hormones
Cholesterol
P450scc
StAR protein
Pregnenolone
17α-hydroxylase
17-OH pregnenolone
17,20 Lyase
Dehydroepiandrosterone sulfate
Dehydroepi-androsterone
17β-HSD
Androstenediol
3β-HSD
3β-HSD
3β-HSD
3β-HSD
Progesterone
17α-hydroxylase
17-OH progesterone
17,20 Lyase
Androstenedione
17β-HSD
Testosterone
21-Hydroxylase
21-Hydroxylase
Aromatase
Aromatase
Deoxycorticosterone
11-Deoxycortisol
Estrone
17β-HSD
Estradiol
11β-Hydroxylase
11β-Hydroxylase
Corticosterone
Cortisol
18-Hydroxylase
18-OH corticosterone
18-Oxidase
Aldosterone

- B12 deficiency
    - Where does B12 come from? Animal products
    - Physiology
        - R factor in saliva binds to B12 and protects it from acidity in the stomach. R factor-B12 travels to the duodenum.
        - Parietal cells produce intrinsic factor, which travels to the duodenum.

        - Pancreatic enzymes cleave B12 from R factor and B12 then binds IF.
        - B12-IF complex is reabsorbed in the terminal ileum
    - Reabsorption where? Terminal ileum
    - Causes of B12 deficiency
        - Extreme vegan
        - Pernicious anemia
        - Pancreatic enzyme deficiency
            - Can't cleave B12 from R factor
        - Crohn's
            - Affects terminal ileum
    - Lab markers
        - Homocysteine HIGH
        - MMA HIGH
    - Presentation?
        - Megaloblastic anemia
        - Subacute combined degeneration (of dorsal columns + lateral corticospinal tract)
        - Peripheral neuropathy
    - Dx of pernicious anemia? anti-IF Ab
- Folate deficiency
    - Where does folate come from? Leafy things
    - Causes of folate deficiency
        - Poor diet (e.g. alcoholics, elderly)
        - Phenytoin
    - Lab markers
        - Homocysteine HIGH
        - MMA normal
    - Presentation? Megaloblastic anemia

- Prophylaxis in HIV+ patients
    - CD4 < 200 → PCP
        - TMP-SMX, inhaled pentamidine, dapsone, atovaquone
    - CD4 < 100 → Toxo
        - TMP-SMX
    - CD4 < 50 → MAC
        - Azithromycin
    - If live in endemic area, CD4 < 250 → Coccidioides Immitis
        - E.g. Arizona, Nevada, Texas, California
        - Itraconazole
    - If live in endemic area, CD4 < 150 → Histoplasma Capsulatum
        - E.g. Kentucky, Ohio, Missouri
        - Itraconazole

- Diabetes insipidus
    - Dx? Water deprivation test
        - Measure serum osmolality & urine osmolality

        - Deprive pt of water
        - Remeasure serum osmolality & urine osmolality
            - If urine osmolality doesn't go up → suspect DI
    - Central DI → deficiency of ADH
        - Pathophys? Supraoptic nucleus not making enough ADH
        - Dx? Give desmopressin → urine osmolality increases significantly
    - Nephrogenic DI → kidneys are not responding to ADH
        - Dx? Give desmopressin → urine osmolality doesn't change much
        - Tx? Hydrochlorothiazide
            - Unless 2/2 lithium, use amiloride or triametere
        - Causes?
            - Lithium
            - SSRIs
            - Carbamazepine
            - Demeclocycline
- Tx of normovolemic hypernatremia? D5W to correct free water deficit
    - Divine says NS, but most other resources I found said correct free water deficit
- Tx of hypovolemic hypernatremia? Give NS first until normal volume, then give D5W
- Consequence of correcting hypernatremia too rapidly? Cerebral edema

- Osteoarthritis
    - Presentation? Old person with joint pain that gets worse throughout the day
    - RF? obesity
    - Imaging findings?
        - Joint space narrowing
        - Subchondral sclerosis
        - Subchondral cysts
        - Osteophytes
    - Arthrocentesis findings? <2000 cells
    - Tx?
        - 1st line acetaminophen
        - 2nd line NSAID (e.g. naproxen)
        - 3rd line joint replacement surgery

- Returned from a business conference 1 week ago + Fever + Nonproductive cough + Abdominal pain + Hyponatremia → Legionella
    - Dx? Urine antigen
    - Tx? FQ or macrolide
        - MaCroLide mnemonic = Mycoplasma, Chlamydia, Legionella
- What are the common causes of atypical PNA? Mycoplasma, Legionella, Chlamydia
    - MC cause? Mycoplasma
    - CXR findings? Interstitial infiltrates
    - HY associations
        - C. Psittaci → birds
        - C. Burnetii → cows, goats, sheet

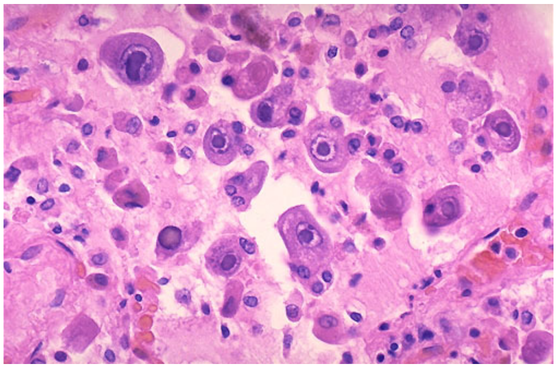
        - Mycoplasma → college student w/ walking pneumonia

- Midsystolic click heard best at the apex. → mitral valve prolapse
    - “Stenosnap & Proclick”
    - RF? Connective tissue disease
        - Marfarn
        - Ehlers-Danlos
        - ADPKD
    - Classic demographic? Young woman
    - Pathophys? Myxomatous degeneration
    - Exam maneuvers
        - Anything that increase amount of blood in LV → murmur softer
            - Increase preload
            - Increase afterload
        - Anything that decreases amount of blood in LV → murmur louder
    - Dx? Echo

- Scaly, itchy skin with yellowish crusting in the winter. → seborrheic dermatitis
    - Tx? Topical antifungals
        - e.g. ketoconazole or selenium sulfide shampoo
    - Classic disease distribution?
        - Hair → e.g. cradle cap
        - Eyebrows

- Episodic HTN + HA → pheochromocytoma
    - Genetic disease associations
        - MEN2A
        - MEN2B
        - VHL
        - NF-1
    - Pathophys? Catecholamine-secreting tumor
    - Location?
        - Adrenal medulla
        - Posterior mediastinum
        - Organ of Zuckerkandl (chromaffin cells along the aorta)
    - Dx?
        - 1st step: urine metanephrines
            - If elevated → CT abdomen
                - If nothing found on CT → MIBG scan
    - Tx? Alpha blocker (e.g. phenoxybenzamine, phenotaline) THEN beta blocker
- Most common cause of a LGIB in the elderly → diverticulosis
    - Dx? Colonoscopy or barium enema
        - Recall that you acutely do a CT scan for diverticulitis, then 6 weeks later colonoscopy to r/o cancer
    - Ppx? Eat fiber

- Megaloblastic anemias
  - Blood smear findings?
    - Hypersegmented neutrophils
    - MCV > 100
  - Classic patient demographic with folate deficiency?
    - Alcoholics
    - Elderly person with poor nutrition
  - Folate synthesis inhibitors
    - Pt with molar pregnancy → methotrexate
      - Pulmonary issue? Pulmonary fibrosis
    - HIV+ pt with ring-enhancing lesions → pyrimethamine-sulfadiazine
      - Pyrimethamine inhibits DHFR
    - AIDS pt on ppx for toxo → TMP-SMX
      - TMP inhibits DHFR
  - Use of leucovorin? Rescue bone marrow in setting of methotrexate toxicity
    - Mechanism? Folinic acid analog

- CMV presentations
  - Esophagitis → linear ulcers
  - Colitis → post-transplant pt
  - Retinitis → HIV pt with CD4 < 50
  - Congenital CMV → periventricular calcifications + hearing loss
    - calcifications elsewhere → toxo
- Histology? Owl's eye intranuclear inclusions
- 
- Tx? Gancicyclovir
  - Resistance? UL97 kinase mutation
  - Tx for resistance? foscarnet

- CD4 < 200 + severe peripheral edema + frothy urine. → FSGS in HIV pt
  - Variant classic in HIV+ pts? Collapsing variant
  - Tx? Steroids + cyclophosphamide + ACE-I
- Indinavir AE? Kidney stones
- triad of fever, rash, and eosinophiluria → acute interstitial nephritis
  - Drugs cause? Penicillins

    - Tx? Stop the drug!
        - Can add steroids if severe

- Vitamin D metabolism
    - Liver converts Vit D to calcidiol (25OH-Vit D). Calcidiol goes to kidney. Alpha-1 hydroxylase converts calcidiol to calcitriol (1,25-OH Vit D).
    - Common causes of Vitamin D deficiency
        - CKD → 1-alpha hydroxyalse deficiency
        - Liver disease → can't make calcidiol
        - CF → malabsorption
        - Crohn's → malabsorption
    - Osteomalacia vs Rickets
        - Osteomalacia in adults
        - Rickets in kids
    - Tx? Calcium + vit D
    - Lab findings?
        - Ca++ low
        - Phos low
            - Low in liver disease
            - High in kidney disease (kidneys can't get rid of phos)
        - PTH high (2ary hyperpara)
        - Alk phos

- Aspiration pneumonia
    - RF?
        - Alcoholism
        - Dementia
        - Neuromuscular problems (e.g. MG, ALS)
    - Bugs?
        - Anaerobes
            - Bacteroides
            - FUsobacterium
            - Peptostreptococcus
        - Klebsiella → currant jelly sputum
    - Tx? Clindamycin
- CURB-65 criteria
    - Purpose? Who to admit
    - Cutoff? 2+ → hospitalize
    - C = confusion
    - U = uremia (BUN > 20)
    - R = RR > 30
    - B = BP < 90/60
    - Age > 65
- Drugs commonly used in PNA treatment
    - Ceftriaxone

    - Levofloxacin
    - Macrolides - great for atypical PNA

- Pharmacological management of pulmonary arterial HTN
    - Endothelin antagonists
        - Bosentan
        - ambrisentan
    - PDE-5 inhibitors
        - Sildenafil
        - Tadalafil
    - Prostacyclin analogs
        - Iloprost
        - Epoprostenol
        - Treprostinil
- Causes?
    - Young female → idiopathic PAH
        - Mutation? BMPR2

- 55 yo F presents with a 5 week history of a rash on her forehead. PE reveals scaly macules with a sandpaper texture. → actinic keratosis
    - RF? Sun exposure
    - Tx? Topical 5-FU
    - Possible dangerous sequelae? Squamous cell carcinoma
    - Most likely disease sequelae? Resolution

1ary hyperparathyroidism	2ary hyperparathyroidism	3ary hyperparathyroidism
Autonomous PTH production Causes? Adenoma Parathyroid hyperplasia PTH high Ca++ high Phos low	Low Ca++ → PTH production Causes? CKD PTH high Ca++ low Phos high	PTH production despite normalized of Ca++ levels Causes? CKD s/p transplant PTH high Ca++ high Phos low

		Tx? Parathyroidectomy (remove 3.5 glands) Cinacalcet (CSR modulator)

- Hypercalcemia
    - Presentation? bones, stones, groans, psychic overtones
    - Tx?
        - 1st step: NS
        - Hypercalcemia of malignancy → bisphosphonates
    - EKG finding? Shortened QT

- Periumbilical pain that migrates to the right lower quadrant. → appendicitis
    - PE findings?
        - McBurney's point tenderness
        - Psoas sign
        - Obturator sign (pain with internal rotation of hip)
        - Rovsing's sign (palpation of LLQ → pain in RLQ)
    - Dx? CT scan
        - Pregnant → US
        - Kid → US
    - Tx? Surgery

- Classic drug and viral causes of aplastic anemia.
    - Drugs?
        - Carbamazepine
        - Chloramphenicol
    - Viral? Parvovirus B19 (single stranded DNA virus)

- Fanconi anemia
    - Pathophys? Problems with DNA repair
    - Fanconi anemia vs Fanconi syndrome
        - Fanconi anemia → cytopenias + thumb anomalies + short stature + cafe-au-lait spots
        - Fanconi syndrome → type 2 RTA (proximal)

- CD4 count of 94 + MRI revealing ring enhancing lesions in the cortex → toxoplasmosis
    - Tx? Pyrimethamine-sulfadiazine
        - Rescue agent for pt who becomes leukopenic with treatment? leucovorin
    - Who should get steroids? Increased ICP
        - For PCP pneumonia:
            - O2 sat < 92
            - PaO2 < 70
            - A-a gradient > 35
    - Ppx? TMP-SMX for CD4 < 100

- Congenital toxo
    - Hydrocephalus
    - Chorioretinitis
    - Intracranial calcifications
- Classic methods of transmission? handling cat litter

- Lupus nephritis
  - Associated autoantibody? anti-dsDNA
  - Classic “immunologic” description? “Full house” pattern
  - Tx? Steroids + cyclophosphamide

- Osteoporosis
  - Screening population? women > 65
  - Screening modality? DEXA scan
  - Dx? T-score < -2.5
  - RF?
    - Postmenopauseal
    - Low BMI
    - Smoking
    - Alcohol
  - Preventive strategies?
    - Weight bearing exercise
    - Smoking cessation
    - Reduce alcohol consumption
  - Tx?
    - 1st line: bisphosphonates + Ca/Vit D supplementation
    - Raloxifene (SERM)
      - Agonist in bone
      - Antagonist in breast
  - Classic locations of osteoporotic fractures
    - Vertebral compression fracture
    - Hip fracture

- Name the PNA
  - Red currant jelly sputum. → Klebsiella
  - Rust colored sputum. → Strep pneumo
  - PNA in an alcoholic. → Klebsiella
  - Post viral PNA with a cavitary CXR lesion. → Staph aureus
  - PNA in a patient that has chronically been on a ventilator. → Pseudomonas
  - MC cause of CAP. → Strep pneumo
- Pharmacological management of MRSA.
  - Vanc
  - Clinda
  - Linezolid
  - Ceftaroline (5th gen cephalosporin)

    - Tigecycline
- Pharmacological management of Pseudomonas.
    - Ceftazidime (only 3rd gen cephalosporin)
    - Cefepime (4th gen cephalosporin)
    - Pip-tazo
    - FQ
    - Carbapenems
    - Aztreonam
    - Aminoglycosides

- JVD and exercise intolerance in a patient with a recent history of an URI. → dilated cardiomyopathy 2/2 viral myocarditis
    - MC cause? Coxsackie B
    - Drug causes?
        - Clozapine
        - Anthracyclines
            - Prevention? Dexrazoxane (iron chelator)
        - Trastuzumab
    - Classic cause in a patient with recent history of travel to S. America? Chagas
        - Potential sequelae?
            - Achalasia
            - Dilated cardiomyopathy
            - Megacolon (2/2 degeneration of myenteric plexus)

- Massive skin sloughing (45% BSA) in a patient that was recently started on a gout medication? TEN
    - Dx?
        - <10% BSA → SJS
        - >30% BSA → TEN
    - Tx? STOP the drug
        - IVF
        - Topical abx to prevention infection

- Tetany and a prolonged QT interval in a patient with recent surgical treatment of follicular thyroid carcinoma. → hypocalcemia due to removal of parathyroids
- Recurrent viral infections + QT prolongation + tetany → DiGeorge syndrome
    - Pathophys? Failure of development of 3rd/4th pharyngeal pouches
- Trousseau and Chvostek signs.
    - Trousseau → inflation of BP cuff causes carpopedal spasm
    - Chvostek → taping on cheek causes facial muscle spasm
- Hypocalcemia that is refractory to repletion → consider hypomagnesemia
- Electrolyte/drug causes of prolonged QT intervals
    - Electrolytes?
        - Hypocalcemia
        - Hypomagnesemia
        - Hypokalemia

    - Drugs?
        - Macrolides
        - FQ
        - Haloperidol
        - Ondensatron
        - Methadone
- Hypoalbuminemia and Ca balance
    - Hypoalbumenia → decrease in total body Ca++, no change in ionized Ca++
    - Drop of 1 in albumin → add 0.8 to Ca++

- Abdominal pain radiating to the back → acute pancreatitis
    - Causes?
        - #1 = Gallstones
        - #2 = Alcohol
        - Hypertriglyceridemia
        - Scorpion sting
        - Handlebar injuries
    - Lab markers?
        - Lipase - most sensitive
        - Amylase
    - Physical exam signs in pancreatitis.
        - Cullen's sign = periumbilical ecchymosis
        - Grey Turner sign = flank ecchymosis
        -
    - Tx? NPO + IVF + pain control
        - Meperidine is a good agent because it doesn't cause sphincter of Oddi spasms
    - Management of gallstone pancreatitis
        - Dx? US then ERCP
        - Tx? DELAYED cholecystectomy
    - What if the patient becomes severely hypoxic with a CXR revealing a "white out" lung? ARDS
        - PCWP? <18 mmHg

- 20 yo M with red urine in the morning + hepatic vein thrombosis + CBC findings of hemolytic anemia. → paroxysmal nocturnal hemoglobinuria
    - Pathophys? Defect in GPI anchors, which attach CD55 and CD59 to cell (they prevent complement from destroying RBC)
        - Sleep → hypoventilation → mild respiratory acidosis → activation of complement cascade
    - Gene mutation? PIGA
    - Dx? Flow cytometry
    - Tx? Eculizumab (terminal complement inhibitor)
        - Vaccine required? Neisseria meningitidis

- Chronic diarrhea and malabsorption in a HIV+ patient + detection of acid fast oocysts in stool. → cryptosporidium parvum
    - Acid-fast organisms

    - Cryptosporidium
    - TB
    - MAC
    - Nocardia
  - Dx? Stool O&P
  - Tx? Nitazoxanide
  - Route of transmission? Contaminated water

- Muddy brown casts on urinalysis in a patient with recent CT contrast administration (or Gentamicin administration for a life threatening gram -ve infection) → ATN

- Woman with morning joint stiffness > 1 hr → RA.
  - Ab?
    - RF (IgM against IgG)
    - anti-CCP - more specific
  - HLA? DR4
  - Pathophys? IgM constant region activates complement → inflammation → formation of pannus (hypertrophied synovium) → damage to cartilage and bone
  - Caplan syndrome = RA + pneumoconiosis
  - Felty syndrome = RA + neutropenia + splenomegaly ("RANS")
  - Classic hand/finger findings/distribution? MCP & PIP joints of hands (DIP joints spared)
  - Imaging findings?
    - Symmetric joint space narrowing
  - Tx? Methotrexate (DMARDs)
    - If no response → TNF alpha inhibitor (e.g. infliximab)
  - Required testing prior to starting methotrexate?
    - PFTs
  - Required testing prior to starting infliximab?
    - TB
    - Hep B/Hep C

- Differentiating Strep pharyngitis from Infectious Mononucleosis
  - LND distribution
    - Anterior cervical → Strep
    - Posterior cervical → Mono
  - Disease onset
    - Acute → Strep
    - Over weeks → Mono
  - Organ involvement
    - Splenomegaly → Mono
- Pt with sore throat takes amoxicillin and gets rash → mono
  - NOT allergic rxn!
- CENTOR criteria
  - C = absence of Cough
  - E = tonsillar Exudates

    - N = nodes/anterior cervical lymphadenopathy
    - T = temp (fever)
    - OR
        - <15 → +1
        - >=45 → -1
- Using CENTOR score
    - 0/1 → don't test, don't treat
    - 2/3 → rapid antigen test
        - Positive → treat
        - Negative → throat culture
    - 4/5 → treat empirically
- Tx of Strep pharyngitis?
    - Amoxillcin
    - If PCN allergic → azithromycin
- Potential sequelae of Strep pharyngitis
    - RF - preventable with abx
    - PSGN

- Endocarditis
    - MC cause of endocarditis? IVDU
        - Bug? Staph aureus
        - Valve? tricuspid
    - Prosthetic valve endocarditis
        - Bug? Staph epidermidis
    - Endocarditis after dental procedure? Viridans group streptococci
        - Strep viridans, Strep mitis, Strep mutans, Strep sanguineous
    - Patient with malar rash and echo showing vegetations on both sides of the mitral valve → Libman-Sacks endocarditis
    - Presentation? Fever + night sweats + new murmur
        - Splinter hemorrhages
        - Roth spots (retinal hemorrhages)
        - Painless Janeway lesions + painful Osler nodes (immune phenomenon)
    - Dx?
        - 1st step: blood cultures
        - TEE
    - Tx? Abx that include Staph aureus coverage (e.g. vancomycin) for WEEKS
    - Bugs implicated in culture negative endocarditis
        - HACEK
            - H = haemophilus
            - A = actinobacillus
            - C = cardiobacterium
            - E = eikenella
            - K = kingella
        - Coxiella burnetii

    - Blood cultures in a patient with endocarditis reveal S. Bovis (or S. Gallolyticus bacteremia). NBS? Colonoscopy
    - Who needs antibiotic prophylaxis?
        - Hx endocarditis
        - Prosthetic valve
        - Unrepaired cyanotic congenital dz
        - Heart transplant with valve dysfunction

- Erythematous salmon colored patch with silvery scale on the elbows and knees. → psoriasis
    - Tx? Topical steroids
    - If this patient presents with joint pain (especially in the fingers)? Psoriatic arthritis
        - Imaging? Pencil-and-cup deformity
        - Tx? NSAIDs

- T of 104 + tachycardia + new onset Afib in a patient with a history of Graves disease. → thyroid storm
    - Lab findings?
        - TSH low
        - T3/T4 high
    - Tx?
        - 1st step: propranolol
        - 2nd step: PTU
        - Then:
            - Prednisone
            - Potassium iodide (Lugul's solution)
                - Wolff-Chaikoff effect → large amounts of iodine inhibit thyroid hormone synthesis

- Biopsy revealing tennis racket shaped structures in cells of immune origin. → Langerhans cell histiocytosis
    - Electron microscopy? Birbeck granules (tennis rackets)
    - Marker? S100

- Small bowel obstruction in a HIV patient with purple macules on the face, arms, and lower extremities. → Kaposi's sarcoma
    - Bug? HHV8
    - Tx? HAART
    - Pathophys of vascular lesions? Overexpression of VEGF

- Fever + rash + eosinophiluria 10 days after a patient started an antistaphylococcal penicillin. → acute interstitial nephritis
    - Tx? STOP drug + steroids

- SLE
    - SOAP BRAIN MD
        - S = serositis

        - O = oral ulcers
        - A = arthritis
        - P = photosensitivity
        - B = blood disorders (cytopenias)
        - R = renal
        - A = ANA/anti-dsDNA
        - I = immunologic
        - N = neurologic findings
        - M = malar rash
        - D = discoid rash
    - Type 2 vs 3 HSRs in lupus
        - Type 2 → cytopenias
        - Type 3 → all other manifestations
    - Lupus Ab?
        - ANA
        - anti-dsDNA
        - anti-Smith
    - Lupus nephritis → full house pattern on IF
    - Antiphospholipid antibody syndrome → recurrent pregnancy losses
        - Pathophys? Thrombosis of the uteroplacental arteries.
    - MC cause of death in lupus patients?
        - What I've read recently: CV disease
        - Per Divine:
            - Treated → infection
            - Untreated → renal dz
                - Also 40x risk MI
    - Endocarditis in lupus pt? Libman-Sacks endocarditis
    - Neonatal 3rd degree heart block → neonatal lupus
        - Maternal autoimmune dz?
            - Sjogren's
            - SLE
        - Ab?
            - anti-SSA/anti-Ro
            - anti-SSB/anti-La
    - Tx?
        - Steroids
        - Cyclophosphamide
        - Hydroxychloroquine → good for skin lesions
- Pulmonary abscesses
    - Bugs?
        - Staph
        - Anaerobes
        - Klebsiella
    - RF?
        - Alcoholism

        - Elderly
        - Post-viral pneumonia
    - MC location of aspiration pneumonia? Superior segment of RLL

- Chest pain worsened by deep inspiration and relieved by sitting up in a patient with a recent MI or elevated creatinine or URI or RA/SLE. → pericarditis
    - EKG findings? Diffuse ST elevations + PR depression
    - PE finding? Friction rub (“scratchy sound on auscultation”)
    - A few days after MI → fibrinous pericarditis
    - Weeks after MI → Dressler’s
    - Tx? NSAIDS
        - Consider adding on colchicine

- Cardiac tamponade
    - Beck’s triad = hypotension + JVD + muffled heart sounds
    - EKG findings? Electrical alternans
    - Type of shock? Obstructive cardiogenic (Amboss)
        - CO low
        - SVR high
        - PCWP high
    - Tx? Pericardiocentesis

- Pearly lesion with telangiectasias on the ear in a farmer. → BCC
    - MC type skin cancer
    - Location? Upper lip
    - Dx? Biopsy
    - Tx? Mohs surgery

- Cold intolerance in a 35 yo white F → hypothyroidism
    - MC cause? Hashimoto’s
    - Histology? lymphoid follicles w/ active germinal centers
    - Lab findings?
        - TSH high
        - T3/T4 low
    - Ab?
        - anti-TPO
        - Anti-thyroglobulin
    - HLA? DR3/DR5
    - Tx? Levothyroxine
    - Future complication? thyroid lymphoma

- Massive hematemesis in a patient with a history of chronic liver disease. → ruptured varices
    - Pathophys? L gastric vein has anastomosis with azygos veins. Increased portal pressure → backward flow from L gastric veins to azygous vein (which empties into SVC).
    - Acute tx? IVF + octreotide + ceftriaxone/cipro + EGD w/ ligation

        - Do NOT give a beta blocker for acute tx
    - Ppx? Beta blocker + spironolactone
    - Other manifestations of elevated portal pressures
        - Caput medusa
        - Internal hemorrhoids
    - Tx for cirrhotic coagulopathies? FFP
        - If uremia → give desmopressin
            - Note: Desmopressin = ADH analog → so, it can cause AE of hyponatremia 2/2 SIADH
- Hemophilia A
    - Pathophys? deficiency of factor 8
    - Inheritance? XLR
    - Coag labs?
        - Bleeding time normal
        - PTT HIGH
        - PT normal
- Hemophilia B
    - Pathophys? deficiency of factor 9
    - Inheritance? XLR
    - Coag labs?
        - Bleeding time normal
        - PTT HIGH
        - PT normal
- Hemophilia C
    - Pathophys? deficiency of factor 11
    - Inheritance? AR
    - Coag labs?
        - Bleeding time normal
        - PTT HIGH
        - PT normal
- Bernard Soulier Syndrome
    - Pathophys? Deficiency of GpIb
    - Coag labs?
        - Bleeding time HIGH
        - PTT normal
        - PT normal
- Glanzmann Thrombasthenia
    - Pathophys? Deficiency of GpIIbIIIa
    - Coag labs?
        - Bleeding time HIGH
        - PTT normal
        - PT normal
- Von Willebrand’s disease
    - Pathophys? Deficiency of vWF
    - Inheritance? AD

    - Coag labs?
        - Bleeding time HIGH
        - PTT HIGH
            - vWF is a protecting group for factor 8
        - PT normal
- ITP
    - Pathophys? Ab against GpIIbIIIa
    - Classic pt? Pt with SLE
    - Tx?
        - Observation
        - Steroids
        - IVIG
        - Splenectomy
- TTP
    - Pathophys? Deficiency in ADAMTS13 enzyme → cannot cleave vWF multimers → activation of platelets → thrombosis → thrombocytopenia
    - Presentation? microangiopathic hemolytic anemia + thrombocytopenia + renal failure + fever + neurologic problems
    - Tx? Plasma exchange transfusion
    -
- HUS
    - Bugs? Shigella or E. coli O157:H7
    - Presentation? microangiopathic hemolytic anemia + thrombocytopenia + renal failure

- Platelet deficiency vs coagulation factor bleeds
    - Platelet deficiency → mucosal bleeds, petechiae, heavy menses
    - Coag factor deficiency bleeds → hemarthrosis

- Why do patients with CKD develop coagulopathy? Uremia → platelet dysfunction
    - Tx? Desmopressin
        - **Note**: Desmopressin = ADH analog → so, it can cause AE of hyponatremia 2/2 SIADH
- Exercising caution with transfusion in patients with Bernard Soulier syndrome
    - Do NOT give transfusion that includes platelets
    - They can have an anaphylactic rxn to GpIb (since they don't have GpIb)

- Oropharyngeal candidiasis.
    - RF?
        - HIV
        - Chronic ICS use
        - TNF inhibitor
    - Micro finding? Germ tubes at 37C
    - Tx oral candidiasis? Nystatin swish-and-swallow
    - Tx invasive candidiasis? Amphotericin B
        - Prevention of Amphotericin B toxicity? Liposomal formulation

- Pleural effusions
    - Light's criteria (must meet all 3 to be considered transudative!)
        - LDH < 2/3 ULN
        - Pleural LDH/serum LDH < 0.6
        - Pleural protein/serum protein < 0.5
    - Causes of transudative effusion
        - CHF
        - Cirrhosis
        - Nephrotic syndrome
        - **Note**: Per UW 2021: Mechanism of transudate effusion?
            - Decreased pulmonary artery oncotic pressure, e.g. hypoalbuminemia in nephrotic syndrome
            - Increased pulmonary capillary hydrostatic pressure, e.g. volume overload in heart failure
    - Causes of exudative effusion
        - Malignancy
        - Parapneumonic effusion
        - Tb
        - **Note**: Per UW 2021: Mechanism of exudate effusion? Inflammatory increased in vascular permeability of membrane (increased flow of interstitial edema into pleural space)
    - Unique cause of both transudative & exudative effusions? PE
    - Classic PE findings?
        - Decreased breath sounds
        - Dullness to percussion
        - Decreased tactile fremitus
    - Tx? Chest tube
- Chylothorax = lymph in the pleural space
    - Pathophys? Obstruction of thoracic duct or injury to the thoracic duct
    - Pleural fluid findings? High Triglycerides

- Holosystolic murmur heard best at the apex with radiation to the axilla in a patient with a recent MI. → mitral regurg 2/2 papillary muscle rupture
    - Dx? Echo
    - Why widely split S2? Aortic valve is closing earlier (LV is emptying into both aorta & LA)
    - Maneuvers that increase intensity
        - Increase preload (putting more blood in that can be regurgitated)
        - Increase afterload

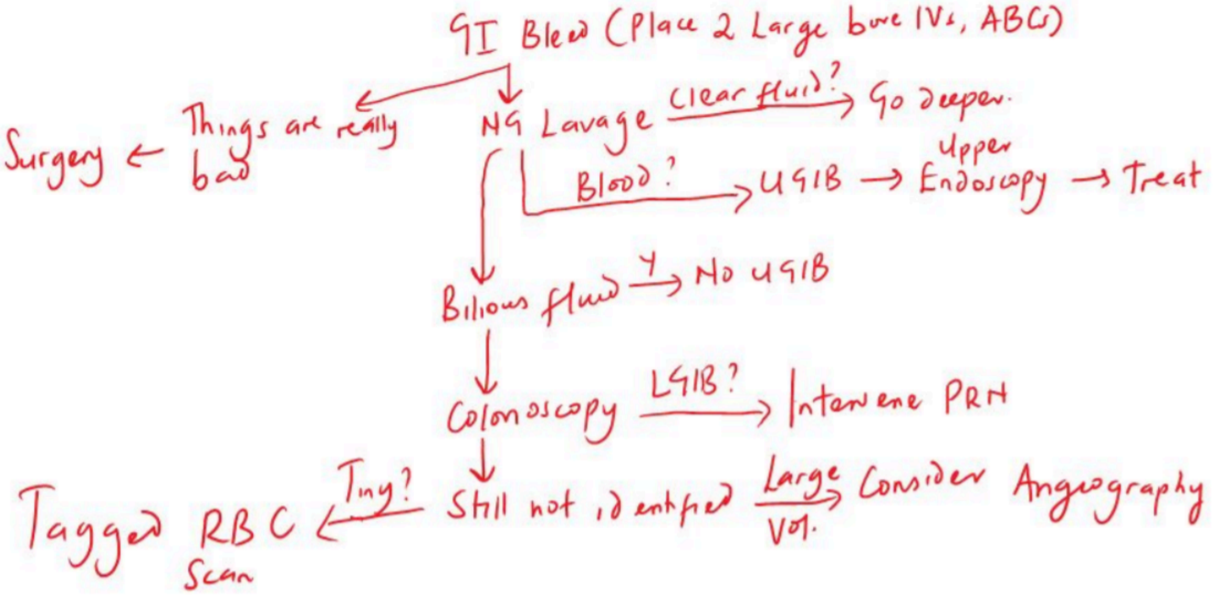
- Decubitus ulcers
    - RF?
        - Elderly
        - Paraplegic
        - Fecal/urinary incontinence
        - Poor nutrition
    - Staging

        - Stage 1 = non-blanchable erythema
            - Tx? Repositioning q2hrs
        - Stage 2 = loss of epidermis + partial loss of dermis
            - Tx? Occlusive dressing
        - Stage 3 = involves entire dermis, extending to subQ fat
            - Does NOT extend past fascia
            - Tx? Surgical debridement
        - Stage 4 = muscle/tendon/bose exposed
            - Tx? Surgical debridement

    - General tx strategies? Repositioning + good nutritional support
    - Marjolin's ulcer = non-healing wound that is actually squamous cell carcinoma

- T1DM
    - Pathophys? Autoimmune destruction of pancreas
    - Ab?
        - anti-GAD 65 (glutamic acid decarboxylase)
        - anti-IA2 (islet tyrosine phosphatase 2)
        - Islet cell autoantibodies
        - Insulin autoantibodies
    - Dx?
        - A1c > 6.5% (twice)
        - Fasting BG >= 126 (twice)
        - Oral glucose tolerance test >= 200 (twice)
        - Sxs of DM + random glucose > 200
    - Tx? Long-acting insulin + mealtime insulin
        - Long-acting
            - Glargine
            - Detemir
        - Rapid-acting
            - Lispro
            - Aspart
            - Glulisine
    - 3 HY complications
        - Nephropathy
        - Retinopathy & cataracts
        - Neuropathy
    - Chronic DM care
        - A1c q3 months
        - Foot exam annually
        - Eye exam annually
        - Microalbumin:Cr ratio annually
    - Nephroprotection in DM? ACE-I
- GI bleed algorithm
    - 1st step: ABCs + 2 large-bore IVs + IVFs

    - 2nd step: NG lavage
        - Clear fluid → go deeper
        - Blood → UGIB → upper endoscopy
        - Bilious fluid → have ruled out UGIB → proceed to colonoscopy
            - See source → intervene as needed
            - See nothing →
                - CT angiography for large bleed
                - Tagged RBC scan for smaller bleed


GI Bleed (Place 2 Large bore IVs, ABCs)
NG Lavage
Clear fluid?
Go deeper.
Things are really bad
Surgery
Blood?
UGIB
Upper Endoscopy
Treat
Bilious fluid
Y
No UGIB
Colonoscopy
LGIB?
Intervene PRN
Still not identified
Large Vol.
Consider Angiography
Tiny?
Tagged RBC Scan

- Antiplatelet Pharmacology
    - Aspirin
        - Mechanism? Irreversibly inhibits COX-1 and COX-2
    - Clopidogrel/ticlopidine = P2Y12 (ADP receptor) blockers
        - Mechanism? Inhibit platelet activation
    - Abciximab/eptifibatide/tirofiban = GpIIbIIIa receptor blockers
        - Mechanism? Inhibit platelet aggregation
- Ristocetin cofactor assay
    - Issues with adhesion step → abnormal result
    - Abnormal ristocetin cofactor assays:
        - Von Willebrand disease
        - Bernard Soulier disease
    - Normal ristocetin cofactor assay:
        - Glanzmann Thrombasthenia
- Von Willebrand disease effects on PTT? Increased
    - Pathophys? vWF is a protecting group for Factor 8.
- Treatment of VWD? Desmopressin
    - Mechanism? Increases release of vWF from Weibel-Palade bodies of endothelial cells
    - **Note**: Desmopressin = ADH analog → so, it can cause AE of hyponatremia 2/2 SIADH

- HSV1 vs HSV2.

    - Oral herpes → HSV1
    - Genital herpes → HSV2
    - Dx? PCR (most up-to-date)
        - Tzanck smear (outdated, not very sensitive, nonspecific) → intranuclear inclusions
    - Brain area affected by HSV encephalitis? Temporal lobes
    - CSF findings in HSV encephalitis? RBCs
    - Tx herpes encephalitis? Acyclovir
        - AE? Crystal nephropathy

- Can't see, can't pee, can't climb a tree. → reactive arthritis
    - HLA? B27
    - Classic bug? Chlamydia
    - Tx? steroids
        - Need abx? Only if ongoing infection
- Can't see, can't pee, can't hear a bee → Alport syndrome
    - Inheritance? X-linked dominant
    -
- Tx of NG & CT
    - NG → treat empirically for both → ceftriaxone + azithro/doxy
    - CT → azithro/doxy

Hypovolemic	Septic	Neurogenic	Cardiogenic
CO low PCWP low SVR high	CO high PCWP normal SVR low Tx? norepi	CO low SVR low	CO low PCWP high SVR high

- Tx anaphylactic shock? epinephrine

- Melanomas
    - ABCDE
        - A = asymmetry
        - B = irregular borders
        - C = color variation
        - D = diameter > 6 mm
        - E = evolving
    - Dx? Full-thickness biopsy
        - Excisional for small lesions
        - Punch for larger lesions
    - Most important prognostic factor → Breslow depth

- DM pharmacology

    - Lactic acidosis → metformin
    - Decreases hepatic gluconeogenesis → metformin
    - Hold before CT w/ contrast → metformin
    - Weight gain → sulfonylureas & TZDs (-glitizones)
    - Diarrhea → acarbose & migliton
        - Inhibits disaccharidases (can't reabsorb disaccharides)
    - Recurrent UTIs → SGLT-2 inhibitors
    - Weight loss → GLP-1 agonists (e.g. liraglutide, exenatide) & DPP4 inhibitors (-gliptins)
    - Contraindicated in pt with HF → TZDs
        - PPAR-gamma receptor found in kidney → water retention
    - Contraindication in pt with MTC → GLP-1 agonists
    - Biggest risk of hypoglycemia? Sulfonylureas

- RF esophageal adenocarcinoma
    - Barrett's esophagus
- RF esophageal squamous cell carcinoma
    - Smoking
    - Drinking
    - Achalasia
- Location esophageal adenocarcinoma? Lower 1/3
- Location esophageal squamous cell carcinoma? Upper 2/3
- MC US? Adenocarcinoma
- MC worldwide? Squamous cell carcinoma
- Presentation? Dysphagia to solids → dysphagia to liquids
- Dx? EGD
- Staging? CT scan or esophageal US

- Factor V Leiden
    - Pathophys? Resistance to protein C
    - Dx? Activated Protein C resistance assay
- Patient needs super large doses of heparin to record any changes in PTT → AT-III deficiency
    - Recall that heparin is a AT-III activator
- 35 yo with a hypercoagulable disorder that does not correct with mixing studies. → antiphospholipid antibody disorder
- Anaphylaxis in a patient with a long history of Hemophilia A → Ab against factor 8 that cause type 1 HSR with transfusion
- Hx of hemophilia, diagnosed 5 years ago. Before you would give them factor 8 concentrate and PTT would normalize. Now they're requirizing larger doses of factor 8 to normalize PTT. → inhibitor formation (antibodies against clotting factors)
- Skin necrosis with Warfarin → protein C/S deficiency
- Prothrombin G20210 mutation → overproduction of factor II

- Rash in dermatomal distribution → VZV infection
    - Contraindications to VZV vaccination?

        - Pregnant woman
        - Kid < 1 year
        - Severe immunosuppression (e.g. HIV with CD4 < 200)
    - Tx? Acyclovir
        - If resistant, foscarnet
    - Tzanck smear findings? Intranuclear inclusions
- Shingles vaccination guidelines? Adults over 60

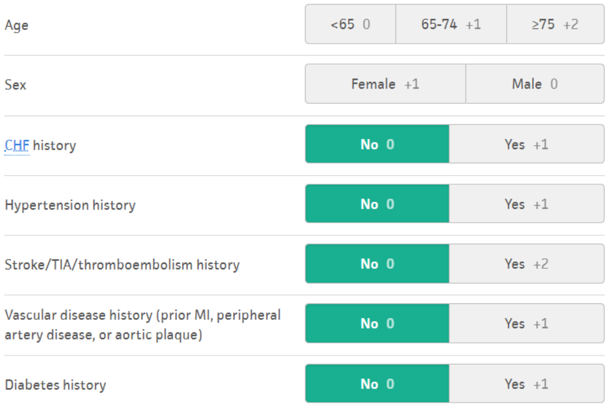
- #1 cause of ESRD in the US → DM nephropathy
    - Histology? Kimmelsteil-Wilson nodules
- #2 cause of ESRD in the US → hypertensive nephropathy
- Pt with BP 240/150. How fast should you lower BP? 25% in first 24 hrs
- Drugs for hypertensive emergencies?
    - Nicardipine
    - Clevidipine
    - Nitroprusside
        - AE? Cyanide poisoning
            - Tx? Amyl nitrate + thiosulfate OR hydroxycobalamin
    - Labelol
- Renal protective medications in patients with DKD or hypertensive nephropathy? ACE-I

- Anemia + Cranial Nerve deficits + Thick bones + Carbonic Anhydrase 2 deficiency + Increased TRAP + Increased Alkaline Phosphatase. → osteopetrosis
    - Pathophys? Carbonic anhydrase is defective → osteoclasts cannot produce acid to resorb bone
    - Tx? IFN-gamma
        - Osteoclasts are a specialized macrophage
        - IFN-gamma is an activator of macrophages

- Clinical diagnostic criteria for Chronic Bronchitis
    - Diagnostic criteria?
        - 2 years
        - 3 months/year of chronic cough
    - PFT findings
        - FEV1 low
        - FEV1/FVC ratio low
        - RV high
        - TLC high
    - Which PFT market can differentiate CB from emphysema? DLCO
        - DLCO normal → CB
        - DLCO low → emphysema
    - Tx acute exacerbation? Abx + bronchodilators + corticosteroids ("ABCs")
    - Prevention? Stop smoking!

- Afib
    - #1 RF? Mitral stenosis

        - #1 RF MS? Rheumatic fever
    - MC arrhythmia in hyperthyroidism → Afib
    - MC site of ectopic foci in Afib → pulmonary veins
    - EKG findings? “Irregularly irregular” + no P eaves
    - Location of emboli formation? LA appendage
    - Who should be cardioverted back to sinus rhythm?
        - New onset (<48 hrs) Afib
        - Anticoagulated for 3 weeks + TEE negative for clot
        - Afib that’s refractory to medical therapy
        - Afib & HDUS
    - Q on T phenomenon? Depolarization during T wave (repolarization) can cause QT prolongation → Torsades → death
        - Prevention? SYNCHRONIZED cardioversion
    - Tx?
        - Rate control
            - Beta blockers
            - ND-CCB (e.g. verapamil, diltiazem)
        - Rhythmic control
            - Amiodarone
    - Reducing stroke risk in Afib? Anticoagulation for CHA2DS2VASc score >= 2
    - Anticoagulation options
        - Valvular cause (e.g. MS) → warfarin
        - Any other cause → warfarin or NOAC
    - Reversal of AC
        - Warfarin → Vit K, four-factor PCC
        - Heparin → protamine sulfate
        - Dabigatran → idarucizumab



Age	<65 0	65-74 +1	≥75 +2
Sex	Female +1	Male 0	
CHF history	[✓ No 0]	Yes +1	
Hypertension history	[✓ No 0]	Yes +1	
Stroke/TIA/thromboembolism history	[✓ No 0]	Yes +2	
Vascular disease history (prior MI, peripheral artery disease, or aortic plaque)	[✓ No 0]	Yes +1	
Diabetes history	[✓ No 0]	Yes +1	

- Crusty, scaly, ulcerating lesion with heaped up borders → squamous cell carcinoma
    - Classic location? Lower lip
    - Precursor lesion? Actinic keratosis
    - What if it arises in a scar or chronic wound? Marjolin ulcer

- Hypothermia + hypercapnia + non pitting edema + hyponatremia + HR of 35 + hypotension in a patient with a history of papillary thyroid cancer → myxedema coma
    - Tx? Levothyroxine + steroids
    - Lab findings?
        - TSH high
        - T3/T4 low
        - LDL high

- Acute onset "dermatologic" breakout in a patient with a recent history of weight loss and epigastric pain. → Leser–Trélat sign associated with visceral malignancy
    - Lymph node associations
        - Supraclavicular → Virchow's node
        - Periumbilical → Sister Mary Joseph
    - What are mets to the ovaries called? Kruckenberg tumor
    - Classic bug associated with gastric cancer? H. pylori (MALToma)
    - Classic histological finding in the diffuse type of gastric cancer? Signet ring cells

- RBCs without central pallor + elevated MCHC + anemia. → hereditary spherocytosis
    - Inheritance? AD
    - Pathophys? Deficiency of spectrin, ankyrin, or band 3.2
    - Intravascular or extravascular hemolysis? Extravascular (RBCs bound by IgG, attacked by splenic macrophages)
    - Dx?
        - Osmotic fragility test
        - Eosin-5-maleimide
        - Acidified glycerol lysis test
    - Tx? Splenectomy
    - Post-splenectomy preventative care?
        - Strep pneumo
        - Hib vaccine
        - Neisseria

- Septic shock
    - Hemodynamic parameters
        - CO high
        - SVR low
        - PCWP normal
        - MvO2 high
    - Tx? IVF + norepi + broad-spectrum abx (cover MRSA + Pseudomonas)
        - E.g. vanc + pip-tazo
        - E.g. vanc + ceftriaxone
    - qSOFA criteria (need 1)
        - AMS
        - RR > 22
        - SBP < 100

    -
- Acute kidney injury

Prerenal AKI	Intrarenal AKI	Postrenal AKI
• FeNA < 1% • BUN/Cr > 20 • Urinary Na < 20	• FeNA > 2% • BUN/Cr < 20 • Urinary Na > 40	Variable Early → like prerenal Late → like intrarenal

- Cor Pulmonale
    - Pathophys? R heart failure from a pulmonary cause
- MC cause of right heart failure? L heart failure

- Papillary thyroid cancer
    - Histology?
        - Psammoma bodies
        - Orphan Annie eye nuclei
- Follicular thyroid cancer
    - Mode of spread? Hematogenous
- Medullary thyroid cancer
    - Tumor marker? Calcitonin
    - What accumulates in the thyroid? Amyloid
    - Histology? Apple green birefringence with congo red stain
    - Genetic disease associations?
        - MEN2A/B
            - Mutation? RET
- Thyroid cancer with worst prognosis? anaplastic

- Diagnostic algorithm for suspected thyroid nodule/cancer
    - TSH
        - Very low → hot nodule (unlikely cancer)
            - NBS? RAIU scan
                - Single hot nodule → toxic adenoma
                - Multiple hot spots → toxic multinodular goiter
                - Diffuse uptake → Grave's
                - No uptake → exogenous thyroid hormone
        - Normal/high → cold nodule
            - NBS? Thyroid US
                - Find something → FNA (can't r/o follicular thyroid cancer!)

- Seizures after total thyroidectomy? Hypocalcemia 2/2 parathyroid gland removal

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Ep. 31: Comprehensive Medicine Shelf Review. Session 3.

- Epigastric pain + Jaundice + Courvoisier's sign + Conjugated hyperbilirubinemia in a long term smoker. → pancreatic cancer
    - Courvoisier's sign = nontender palpable gallbladder + painless jaundice
    - Dx? CT abdomen
    - Tumor markers (pancreatic)?
        - CA19-9
        - CEA
    - Migratory thrombophlebitis = eps of vessel inflammation due to blood clot (thrombophlebitis) that appear in different areas throughout the body
    - Relief of severe jaundice and pain in unresectable disease → ERCP to remove obstruction

- What is the one commonly tested vitamin that should be routinely replenished in patients with hemolytic anemia? Folate
    - Why? They are constantly undergoing RBC DNA synthesis

Nephritic	Nephrotic
<3.5 g protein/24 hrs RBC casts HTN	>3.5 g protein/24 hrs Lipid casts Hypoalbuminemia Anasarca

- Nephritic and nephrotic syndromes associations
    - Tram tracks → MPGN (membranoproliferative GN)
    - Subepithelial humps → PSGN
    - Kimmelstiel Wilson nodules → diabetic nephropathy
    - Subepithelial spike and dome → membranous nephropathy
    - Nephrotic Syndrome in a HIV+ patient → collapsing FSGS
    - Normal appearing glomeruli on light microscopy → minimal change
    - Apple Green Birefringence with Congo Red staining → amyloidosis

- 27 yo M was found down by his friend 13 hrs after they left a bar the night before. EKG is notable for peaked T waves. Creatinine is 4.5. → rhabdo
    - Pathophysiology? Rhabdo → K+ release from myocytes → hyperkalemia
    - Tx hyperkalemia?
        - 1st: calcium gluconate
        - Drive K+ inside cells
            - insulin + glucose

            - Albuterol
            - Sodium bicarb
        - Reduce total body K+
            - Kayexalate
            - Diuretic (e.g. loop or HCTZ)

- Life threatening sinusitis in a patient with a HbA1C of 9%. → mucormycosis
    - Bug? Mucor or rhizopus
    - Tx? Amphotericin B

- 25 yo F with a history of T1DM presents with a history of recurrent abscesses in the axillary and perineal region. → hidradenitis suppurativa
    - Pathophys? Inflammation of apocrine sweat glands

- MC cause of skin abscesses (bug)? Staph aureus
    - Tx? clinda

- Total and fT4 levels in pregnancy.
    - Total T4 increases
        - Why? thyroxine-binding globulin goes up
    - Free T4 normal
- Best initial test in a diagnosis of hyperthyroidism? TSH
- Graves disease
    - Pathophys? Autoantibodies against TSH receptor
- RAIU results in Graves vs Toxic Adenoma vs Toxic Multinodular Goiter vs Surreptitious T4 intake.
    - Diffuse uptake → Graves
    - One spot → toxic adenoma
    - Multiple spots → toxic multinodular goiter
    - No uptake → exogenous T4 or Hashitoxicosis
- Differentiating between surreptitious T4 use and other hyperthyroid states.
    - Hashitoxicosis → high thyroglobulin (thyroid hormone was produced by thyroid)
    - Exogenous T4 → low thyroglobulin
    - Thyroglobulin = C-peptide of thyroid
- Antithyroid pharmacology
    - PTU & methimazole
        - Mechanism? Inhibit TPO

- Gradations in the neoplastic potential of colonic polyps
    - Villous > tubulovillous > tubular
- Adenoma-Carcinoma sequence (AK-53)
    - APC → Kras → p53
- Hyperpigmented macules on lip + GI tract hamartomas → Peutz-Jeghers syndrome
    - Associated malignancy? Colon, pancreatic, breast, gyn

- Sickle cell disease

  - Pathophys? Mutated beta-globin
  - Mutation? Glu to val
  - Vaccines? Encapsulated organisms (SHiN)
    - Why? Sickle cell pts tend to auto-infarct spleen by age 5
  - Osteomyelitis in a SS patient → Salmonella
  - Painless hematuria in a SS patient (or SS trait) → renal papillary necrosis
    - Other non-SS causes? Chronic NSAIDS
  - Aplastic crisis in a SS patient → parvovirus B19
  - Classic peripheral smear findings
    - Sickle cells
    - Howell-Jolly bodies
      - Why? Spleen normally removes nuclear material in RBCs
  - Tx? Hydroxyurea
    - Mechanism? Inhibits ribonucleotide reductase

- Worst headache of a patient's life. PE is notable for palpable bilateral flank masses. → SAH in pt with ADPKD
  - Pathophys? Rupture of berry aneurysm
  - Mutation? PKD1/PKD2
  - Associations
    - MVP
    - Berry aneurysm (circle of Willis)
      - MC location? ACom
    - Liver cysts
    - Pancreatic cysts
  - Dx for SAH? Non-con head CT
    - If negative → LP (look for xanthochromia)
  - Prevention of post-SAH vasospam? nimodipine

CREST syndrome	Diffuse scleroderma
C = calcinosis R = Raynaud E = esophageal dysmotility S = sclerodactyly T = telangiectasias Ab? anti-centromere	Ab? anti-Scl70, anti-topoisomerase

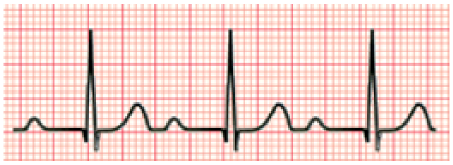
- Tx scleroderma renal crisis → ACE-I
- Nephrogenic systemic sclerosis association? Gadolinium (MRI contrast)

- Sudden BP drop to 40/palpable in a patient who was recently placed on a ventilator with a PEEP of 15 cm H20. → tension pneumothorax
  - Tx? Thoracentesis (needle compression) 2nd intercostal space midclavicular line?

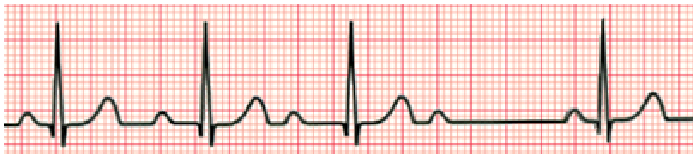
- Basic ventilator strategies
    - Hypercarbia → increase ventilation → increase RR or tidal volume
    - Improving hypoxia → increase FiO2 or increase PEEP

- AV blocks
    - First degree/Mobitz 1 blocks generally require no treatment
        - Only treat if symptomatic
    - Mobitz 2/3rd degree blocks often require pacemaker placement.
    - In unstable patients with heart blocks, consider some sort of pacing.

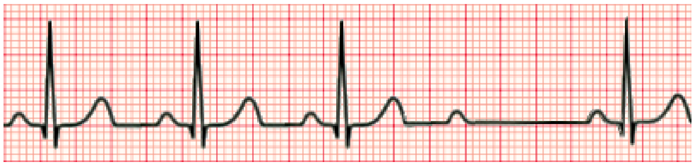
First degree AV block



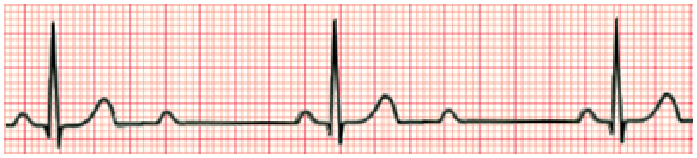
Second degree AV block (Mobitz I or Wenckebach)



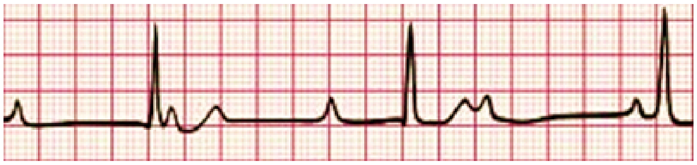
Second degree AV block (Mobitz II)



Second degree AV block (2:1 block)



Third degree AV block with junctional escape



- HY differences between cellulitis and erysipelas
    - Cellulitis
        - Involved layers? dermis + SQ fat
        - Bugs? Staph aureus + GAS
        - Tx? Clinda
    - Erysipelas

        - Involved layers? Superficial dermis + lymphatic vessels
        - Bug? GAS
        - Presentation? More acute + more fevers
        - Appearance? Well-circumscribed, elevated compared to surrounding skin

- G6PD deficiency
    - Pathophys? G6PD deficiency → problems with oxidative phase of the PPP → can't produce NADPH
    - Classic triggers?
        - Stress
        - Infections
        - Fava beans
        - Drugs: primaquine, dapsone
    - Blood smear findings?
        - Heinz bodies
        - Bite cells
    - Dx? Assay for G6PD activity **AFTER** hemolytic episode has resolved
    - Inheritance? XLR

- Rash after getting amoxicillin for a URI in a 19 yo M with posterior cervical lymphadenopathy. → mononucleosis
    - Blood smear findings? Atypical lymphocytes ("Downey cells")
    - Dx? Monospot test
        - What if its looks like mono but monospot is negative? CMV
    - Associated malignancies
        - Burkitt's lymphoma t(8,14)
        - Primary CNS lymphoma
        - Nasopharyngeal carcinoma

- Heavy proteinuria + hyperlipidemia + hypoalbuminemia + EM revealing podocyte foot process effacement + normal glomeruli on LM. → minimal change disease
    - Malignancy associations? Hematologic malignancies

- Dry eyes + Dry mouth in a 40 yo F who delivered a child with congenital heart block. → Sjogren's disease
    - Ab?
        - anti-SSA/anti-Ro
        - anti-SSB/anti-La
    - Bx findings? Lymphocytic infiltrate
    - Tx? Artificial tears + pilocarpine (muscarinic agonist)

- Panacinar emphysema + elevated LFTs in a 35 yo M. → alpha-1 antitrypsin deficiency
    - Pathophys?
        - Misfolded alpha-1 AT accumulates in hepatic cells.
        - Alpha-1 AT is a protease inhibitor, so lungs are more susceptible to proteases

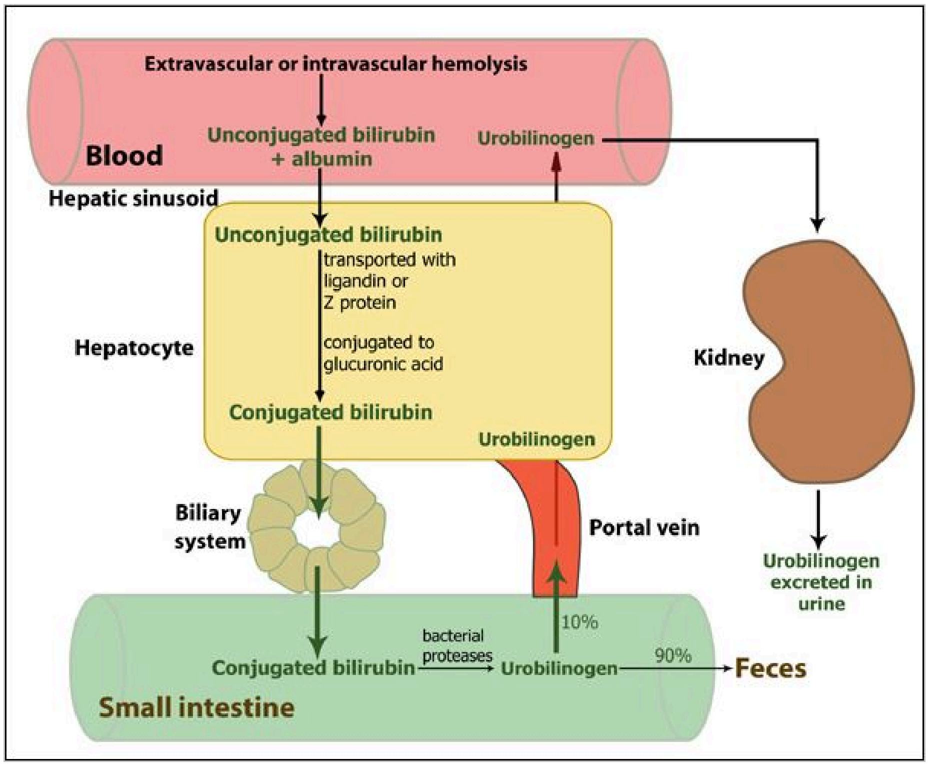
        - Inheritance? Autosomal codominant
            - PiZZ is worst
- Liver bx finding? PAS-positive globules
- Tx? Pooled alpha-1 antitrypsin
- Prevention? NO SMOKING!

- Systolic crescendo-decrescendo murmur heard best at the right 2nd interspace with radiation to the carotids. → aortic stenosis
    - Pathophys? Calcification of the valve leaflets
    - Early onset? Bicuspid aortic valve
    - Prognostic indicators by severity? "ASH" (pt will become ashes)
        - Angina
        - Syncope
        - HF sxs - worst (death within 1 year)
    - Maneuvers that changes murmur intensity
        - Increase preload → murmur increases
        - Increase afterload → murmur decreases
    - Dx? Echo
    - Tx? Replace valve
    - Associated anemia? Shearing RBCs
        - Lab findings?
            - LDH increased
            - Haptoglobin decreased
            - Indirect hyperbilirubinemia
    - Heyde's syndrome = gastrointestinal bleeding from angiodysplasia in the setting of AS
        - Pathophy hypothesis? Calcified valve → cleavage of vWF multimers → issues with clotting

- Acne vulgaris
    - Pathophys? Inflammation of sebaceous glands
    - Bug? Propionibacterium acnes
    - Stepwise management
        - 1st: topical retinoids
        - 2nd: topical abx
        - 3rd: oral abx
        - 4th: isotretinoid (Vit A derivative)
            - Pregnancy test before starting
            - 2 forms of birth control
            - AE?
                - Teratogen
                - Hepatotoxic
                - Skin dryness
    - Adjunct considerations in treatment? OCPs in woman
    - Treatment of acne in patients with PCOS? OCPs or spironolactone

- Congenital adrenal hyperplasia
    - 21-hydroxylase → virilization only
        - Female - virilization
        - Male - precocious puberty
    - 11-hydroxylase → HTN & virilization
    - 17-hydroxylase → HTN only
        - Hypokalemia
        - Only zona glomerulosa is working
    - Dx of 21-hydroxylase deficiency? Elevated 17-hydroxyprogesterone
    - Cosyntropin stimulation test → no rise in cortisol
    - Tx? Replace glucocorticoids & mineralocorticoids* (*if needed)
        - Don't forget about stress dosing of steroids!

- Increased direct bilirubin + Increased urine bilirubin + decreased urine urobilinogen + elevated alkaline phosphatase → biliary obstruction
    - Increased urine bilirubin because D-bili is water soluble
    - Urobilinogen is decreased because GI flora convert D-bili to urobilinogen
- Increased indirect bilirubin + No urine bilirubin + increased urine urobilinogen. → hemolysis
    - Urine bilirubin is NOT increased because I-bili in not water soluble
    - Urine urobilinogen increased because you are sending more bilirubin to the GI tract


Extravascular or intravascular hemolysis
Blood
Unconjugated bilirubin + albumin
Urobilinogen
Hepatic sinusoid
Unconjugated bilirubin
transported with ligandin or Z protein
conjugated to glucuronic acid
Hepatocyte
Conjugated bilirubin
Urobilinogen
Kidney
Biliary system
Portal vein
Urobilinogen excreted in urine
10%
bacterial proteases
Conjugated bilirubin
Urobilinogen
90%
Feces
Small intestine

- Common causes of direct and indirect hyperbilirubinemia.
    - Direct
        - Biliary atresia

        - Primary sclerosing cholangitis
            - Pathophys? destruction of intrahepatic and extrahepatic bile ducts
            - Association? Ulcerative colitis
            - Marker? p-ANCA
            - Imaging finding? Beads on a string
        - Primary biliary cholangitis
            - Pathophys? Destruction of intrahepatic bile ducts
            - Ab? Anti-mitochondrial
    - Indirect
        - Gilbert syndrome
        - Crigler-Najjar syndrome
        - Hemolysis

- High output heart failure in a patient with hemolytic anemia
    - Pathophys? Anemia → low O2 carrying capacity → have to increase CO to meet tissue O2 demand
- Classic bone cause of high output heart failure? Paget's disease
    - Pathophys? Hypervascular
- Classic vascular cause of high output heart failure? AV fistula
    - E.g. from trauma
    - PE finding? Pulsatile mass

- Lyme disease.
    - Bug? Borrelia burgdorferi
        - Shape? spirochete
    - Vector? Ixodes tick
        - Other things carried? Babesia & Anaplasma
    - Classic skin presentation in early disease? Bullseye rash
    - Classic presentations in later stage disease
        - Arthritis
        - Bell's palsy
        - Heart block
        - Meningitis
    - Dx? ELISA
        - Confirmatory test? Western blot
    - Tx? Doxy for > 8 yo
        - Pregnant → amoxicillin
        - Kid <8 yo → amoxicillin
    - Tx of Lyme-associated meningitis and heart block? Ceftriaxone

- Autoantibody associated with mixed connective tissue disease? anti-RNP (anti-U1-ribonucleoprotein)

- Chronic bronchiectasis + renal failure → secondary amyloidosis
    - Dx bronchiectasis? High-res CT scan
    - Common causes of bronchiectasis?

        - CF
        - Kartagener's syndrome (primary ciliary dyskinesia)
    - Obstructive or restrictive pattern on PFT? Obstructive
    - DDx bronchiectasis vs chronic bronchitis
        - Bronchiectasis = **a/w chronic respiratory tract infections** + chronic cough + **daily copious mucopurulent sputum**; sputum is foul-smelling
            - Mechanism? Irreversible dilation and destruction of bronchi → results in chronic cough and inability to clear mucus
        - Chronic bronchitis = **a/w cigarette smoking** + white sputum
            - Chronic productive cough for ≥ 3 months for 2 consecutive years

- Hypertensive urgency/emergency
    - BP cutoff? 180/120
    - What defines hypertensive emergency? End-organ damage
    - Tx?
        - Nitroprusside
        - Labetalol
        - Clevidipine
        - Nicardipine
    - BP lowering goals? 25% in the first 24 hrs
    - Lactic acidosis and altered mental status in a patient on nitroprusside infusion → cyanide poisoning

- Painful, erythematous pretibial nodule. → erythema nodosum
    - Bug? coccidioides immitis
    - Autoimmune disease association? sarcoidosis

- Cushing's syndrome
    - Pathophys? Overproduction of cortisol
    - Dx?
        - 1st step: confirm hypercortisolism
            - 24-hr urinary cortisol
            - Late night salivary cortisol (normally is low)
            - Low-dose dexamethasone suppression test
        - 2nd step: check ACTH levels
            - Low ACTH → adrenal adenoma
                - Overproduction by adrenal cortex → ACTH suppression
            - High ACTH → Cushing's disease, ectopic ACTH
        - 3rd step: high-dose dexamethasone test
            - Suppression → pituitary lesion
            - No suppression → ectopic ACTH (small cell lung cancer)
    - Interstitial infiltrates in a patient on long term steroids. → PCP pneumonia
    - Bone protection for pt on chronic steroids? Bisphosphonates
    - Small cell lung cancer paraneoplastic syndromes
        - SIADH

        - LEMS
        - Ectopic ACTH

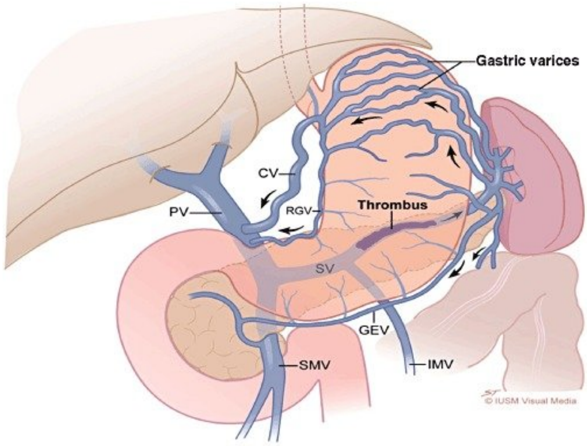
- Secretory vs Osmotic diarrhea
    - Secretory
        - Pathophys? Secreting electrolytes into GI tract and water follows
        - Examples:
            - Cholera
            - ETEC
            - VIPoma
            - Zollinger-Ellison syndrome
            - Medullary thyroid cancer
                - Calcitonin increases electrolyte secretion in the GI tract
            - Microscopic colitis
        - Stool osmotic gap < 50
            - Stool osmotic gap = 290 - 2(Na + K)
            - Small gap means that electrolytes account for most of stool osmolality
    - Osmotic diarrhea
        - Pathophys? Something that is osmotically active (non-electrolyte) is in the GI tract and drawing in water
        - Examples?
            - Lactose intolerance
            - Celiac dz
            - Osmotic laxatives (e.g. lactulose, PEG)
            - Sugar alcohols (e.g., mannitol, sorbitol, xylitol)
            - Alpha-glucosidase inhibitors (acarbose, miglitol)
        - Stool osmotic gap > 100
            - Stool osmotic gap = 290 - 2(Na + K)
            - Large gap means that unmeasured non-electrolytes account for most of stool osmolality
    - Inflammatory diarrhea
        - Causes?
            - UC
            - Crohn’s
            - Shigella
            - EHEC
            - Salmonella
            - Campylobacter
            - Entamoeba histolytica

- Reed Sternberg cells on lymph node biopsy → Hogkin’s lymphoma
    - Immune markers? CD15 & CD30
    - What are the 4 types of this malignancy?
        - Lymphocyte predominant - best prognosis
        - Nodular sclerosing - MC type

        - Mixed cellularity
        - Lymphocyte depleted - worst prognosis
    - What does an increased number of RS cells correlate with? Worse prognosis
    - Associated bug? EBV
    - Dx? LN biopsy
    - Staging?
        - 1 LN → stage 1
        - >1 LN on same side of diaphragm → stage 2
        - >1 LN on opposites side of diaphragm → stage 3

- Rheumatic fever
    - Diagnostic criteria
        - J = joints
        - O = heart
        - N = subcutaneous nodules
        - E = erythema marginatum
        - S = Sydeham's chorea
    - Prevention? Abx for Strep pharyngitis
        - Abx do NOT prevent PSGN
    - Affect heart valve? "MAT"
        - MC = Mitral
        - 2nd MC = Aortic
        - 3rd MC = Tricuspid
    - Tx? penicillin/amoxicillin

- Membranous nephropathy
    - Associated bug? Hep B/C
    - Associated malignancy? hematologic
    - EM finding? Subepithelial spike-and-dome
    - Sudden onset severe flank pain in a patient with a history of membranous nephropathy → renal vein thrombosis
        - Pathophys? Loss of AT-III in urine → hypercoagulable state
- Venous thrombosis sites
    - P. vera → hepatic vein thrombosis
    - Pt with pancreatitis → splenic vein thrombosis → gastric varices
    - Nephrotic syndrome → renal vein thrombosis



Dermatomyositis	Polymyositis
• Kids • CD4-mediated • Perimysial/perifascicular inflammation	• Adults • CD8-mediated damage • Endomysial inflammation

- Dermatomyositis and Polymyositis
    - Presentation? Proximal muscle weakness
    - Skin findings a/w dermatomyositis
        - Heliotrope rash
        - Gottron’s papules
        - Shawl sign
    - Associated malignancies? Lung cancer
    - Dx?
        - 1st step: check CK
            - If CK elevated → MRI muscle
            - If MRI equivocal → muscle biopsy & EMG
    - Ab? Not involved in diagnostic pathway
        - anti-Jo
        - anti-Mi 2
        - anti-SRP
    - Tx? High-dose steroids

- Sarcoidosis.
    - Demographic? African American female
    - CXR findings? Bilateral hilar lymphadenopathy
    - Associations
        - Eye → anterior uveitis
        - Skin → erythema nodosum
    - Pattern of lung disease? Restrictive
    - Lab findings?
        - Elevated ACE

        - Hypercalcemia
            - Why? Macrophages produce 1-alpha-hydroxylase, which release in high calcitriol
    - Histology? Non-caseating granulomas
    - TB skin testing → false negative
    - Tx? Most people don't require tx
        - Steroids if they need tx

- Systolic vs diastolic heart failure
    - Systolic HF
        - Reduced EF
        - Eccentric hypertrophy
        - Volume overload
    - Diastolic HF
        - Normal/high EF
        - Concentric hypertrophy
        - Pressure overload

- Heart failure
    - Signs from history? Dyspnea, orthopnea, PND
    - Dx? echo
    - Tx acute CHF exacerbation? LMNOP
        - L = Lasix (furosemide)
        - M = morphine
            - Can dilates coronary vessels
        - N = nitrates
        - O = O2
        - P = positioning
    - Drugs shown to improve survival in HF patients?
        - Beta blockers: carvedilol, bisoprolol, ER metoprolol
        - Spironolactone
        - ACE-I/ARB
        - BiDil (isosorbide dinitrate + hydralazine)
    - HY Inotropes
        - Digoxin (inhibits Na-K ATPase)
        - Milrinone (PDE-3 inhibitor)

- Targetoid skin lesions in a patient with Mycoplasma Pneumoniae (or HSV) → erythema multiforme
    - Classic drug association?
        - Beta-lactams
        - Sulfonamides
        - Phenytoin

Ectopic ACTH	Cushing's disease (anterior pituitary overproducing ACTH)	Iatrogenic Cushing's syndrome

● CRH low ● ACTH high ● Cortisol high	● CRH low ● ACTH high ● Cortisol high	● CRH low ● ACTH low ● Cortisol high

- Determining the cause of hypercortisolism with excessive ACTH secretion when the high dose dexamethasone suppression test is equivocal? Inferior petrosal sinus sampling
  - Elevated inferior petrosal ACTH → likely pituitary tumor
- Tx of Cushing’s syndrome? Ketoconazole
  - Mechanism? Inhibits several enzymes in the steroid synthesis pathway

- Fever + RUQ pain radiating to shoulder → acute cholecystitis
  - Dx? US
    - If negative but high suspicion? HIDA scan
  - Tx? Antibiotics + cholecystectomy
    - Antibiotics
      - Cipro + Metronidazole

        or
      - MAG = metronidazole + amoxicillin + gentamicin

- Cholecystitis without stones in a very sick pt → acalculous cholecystitis
  - RF?
    - Prolonged ICU stay
    - Prolonged TPN
      - GB isn’t contracting a lot
  - Tx? Percutaneous cholecystostomy
    - Do NOT do surgery!!

- Non-Hodgkin’s lymphoma
  - Follicular lymphoma
    - t(14, 18)
    - Pathophys? Overproduce BCL2 → reduced lymphocyte apoptosis
    - Biopsy findings? Lymphoid follicles
  - Burkitt’s Lymphoma
    - t(8,14)
    - Pathophys? C-myc overamplication
    - Biopsy findings? Starry sky pattern
    - Endemic presentation → jaw mass
    - Sporadic presentation → abdominal mass
  - Mantle cell lymphoma
    - t(11,14)
    - Pathophys? Overexpression of cyclin D1 → aberrant progression from G1 to S phase

- TB
  - TB induration guidelines

        - > 5 mm
            - Immunosuppressed
            - HIV+
            - TB exposure
        - > 10 mm
            - Incarcerated
            - Healthcare worker
        - > 15 mm
            - Everyone
    - Dx? TST or IGRA
        - Positive skin test → CXR
            - Nothing on CXR → latent TB
    - Tx active TB?
        - RIPE for 2 months
        - RI for 4 months
    - Tx latent TB? INH for 9 months
    - Vitamin supplementation? B6
    - TB drug adverse effects
        - Red secretions + hepatotoxic → rifampin
        - Nephrotoxic + hepatotoxic → isoniazid
            - Use “INH” as mnemonic
        - Sideroblastic anemia → isoniazid
        - Drug-induced Lupus → isoniazid
            - Ab? Anti-histone
        - Ethambutol → color blindness
    - Where does TB love to reactivate? Upper lobes

- Bartter’s Syndrome
    - Location? Thick ascending limb of loop of Henle
    - Pathophys? Na-K-2Cl transporter defective (like taking a loop diuretic)
    - Inheritance? AR
    - Lab findings?
        - Hypocalcemia
- Gitelman’s Syndrome
    - Location? DCT
    - Inheritance? AR
    - Pathophys? Na-Cl symporter is dysfunctional (like taking a thiazide diuretic)
    - Lab findings?
        - Hypercalcemia
    - Association?
        - CPPD

- Diastolic blowing murmur heard best at the left sternal border in the setting of a widened pulse pressure → aortic regurg
    - PE findings?

        - Waterhamer pulse
        - Head bobbing
- Wide pulse pressure in a kid → PDA
- Next step in the management of the following scenarios
    - 2+ systolic murmur → nothing
    - 3+ systolic murmur → echo
    - symptomatic 1+ systolic murmur → echo
    - diastolic murmurs → echo

- General diagnostic strategy for cutaneous fungal infections → KOH prep
- Tinea Versicolor
    - Bug? Malassezia furfur
    - Microscopy? Spaghetti & meatballs
    - Tx? Selenium sulfide topical
- 3 common causes of dermatophyte infection
    - Trichophyton
    - Microsporum
    - Epidermophyton
- Differences between the treatment strategies employed in tinea capitis vs tinea unguium vs tinea corporis
    - Tinea corporis → topicals
    - Tinea capitis / tinea unguium → oral (terbinafine or griseofulvin)
- Painful red lesion under skin folds → intertrigo
    - Bug? Candida

- Beads on a string appearance with ERCP in a 30 yo M with a past history of chronic bloody diarrhea. → PSC in UC pt
    - Pathophys? Destruction or intrahepatic & extrahepatic bile ducts
    - Marker? p-ANCA
    - Tx? Liver transplant

- HY antineoplastic associations
    - Pulmonary fibrosis → methotrexate, bleomycin, busulfan
        - Which works in the G2 phase? bleomycin
        - Other drugs causing pulmonary fibrosis? Nitrofurantoin, amiodarone
    - Methotrexate toxicity rescue agent → leucovorin
    - Inhibits thymidylate synthase → 5-FU
        - Toxicity worsened by leucovorin
    - Toxicity with allopurinol/febuxostat→ 6-MP/Azathioprine
        - Why? Metabolized by xanthine oxidase
    - Antineoplastic for pediatric cancers → Actinomycin D
    - Irreversible dilated cardiomyopathy → Doxo/Daunorubicin
        - Prevention? Dexrazoxane (iron chelator)
    - Hemorrhagic cystitis→ cyclophosphamide
        - Metabolic? Acrolein

        - Prevention? Mesna
    - Antineoplastic for brain cancer → nitrosoureas
    - Peripheral neuropathy → Vinca Alkaloids/Taxanes
    - Nephrotoxicity + ototoxicity → Cisplatin
        - Prevention of nephrotoxicity? Amifostine
    - Strongest association with n/v → Cisplatin
    - Inhibits ribonucleotide reductase → hydroxyurea
        - Indication? Sickle cell (increased HbF)

- Most common HIV treatment regimen? 2 NRTIs + protease inhibitor/integrase inhibitor
- HY HIV drug side effects
    - Ritonavir → fat redistribution & CYP inhibition
    - Indinavir → nephrolithiasis
    - Other protease inhibitors → metabolic syndrome
    - Stavudine & didanosine → pancreatitis
    - AZT → bone marrow suppression
    - Abacavir → life-threatening HSR
        - Check which HLA? HLA B57
    - NNRTIs like Efavirenz → teratogen & vivid dreams

- 55 yo M + hats don't fit + mild deafness + high output heart failure → Paget's disease
    - Lab findings? Elevated alk phos
    - Tx? Bisphosphates
    - Dx? Bone scan
    - Associated malignancy? Osteosarcoma
        - Genetic mutation that increases risk? Rb
        - Osteoporosis drug that increases risk? Teriparatide

- 50 yo F with a history of proximal shoulder pain + jaw pain with swallowing presents with a severe unilateral headache and eye pain. → temporal arteritis
    - NBS? Steroids
    - Dx? Temporal artery biopsy
        - AFTER giving steroids!
    - Classic demographic? Female > 50
    - Lab findings? Elevated ESR

- Intense pruritus between the finger webs and toes in a patient with poor grooming and hygiene. → scabies
    - Tx? Permethrin
        - Lindane can cause seizures

- Type 1 diabetic with abdominal pain + ketones in urine → DKA
    - Presentation?
        - "DKA can cause Death Fast"
        - D = Delirium/altered mental status/psychosis

        - K = Kussmaul respirations (rapid and deep breathing)
        - A = Abdominal pain/n/v
        - D = Dehydration
        - F= Fruity breath
    - Pathophys? Absolute insulin deficiency → can't inhibit glucagon
    - Lab findings?
        - AG metabolic acidosis → low pH
        - Ketones in urine
    - Contrast K and Na balance
        - Low total body K+ (even if hyperkalemic)
        - Hyperosmolar hyponatremia
    - Tx? IVF + regular insulin infusion + potassium repletion
    - When do you stop an insulin infusion? Anion gap has closed
    - Discussion of the different kinds of insulin
        - Long acting = glargine + detemir
        - Intermediate acting = NPH
        - Rapid acting = regular
        - Ultra rapid acting = lispro + aspart + glulisine
    - Risk of reducing glucose too quickly? Cerebral edema

- Pruritus and RUQ pain in a 45 yo F with conjugated hyperbilirubinemia. → PBC
    - Pathophys? Destruction of intrahepatic bile ducts
    - Ab? Anti-mitochondrial
    - Tx? Ursodiol (improves survival)
        - Symptomatic tx of pruritus? Benadryl
    - Curative tx? Liver transplant

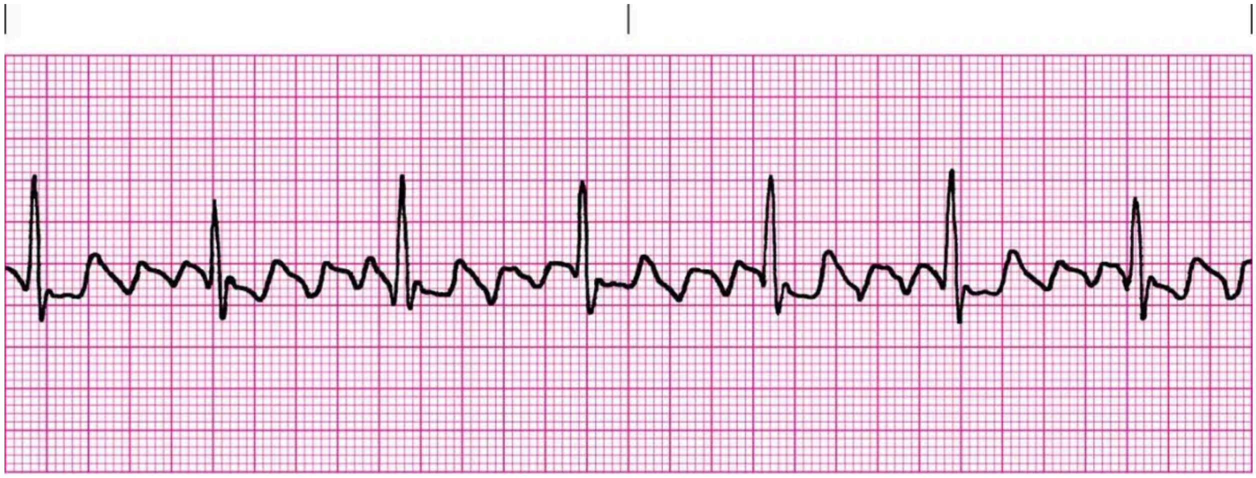
- "Moonshiner" with abdominal pain, cognitive deficits per family, and wrist drop → lead poisoning
    - Anemia associated with this disease? Sideroblastic
        - Pathophys? ALAD and ferrochelastase inhibition
    - Blood smear findings?
        - Ringed sideroblasts
        - Basophilic stippling
    - Dx? Lead level
    - Tx?
        - Lead level 45-69 → Succimer = DSMA
        - Lead level > 70 → EDTA or dimercaprol
    - Other RF?
        - Lives in old house
        - Drinks from foreign pottery

- Presentation of Shigella and EHEC diarrhea → bloody diarrhea
    - HUS triad = microangiopathic hemolytic anemia + thrombocytopenia + renal failure
    - Tx? Supportive
        - Do NOT give abx as this increases mortality!

- Flank pain, palpable flank mass, hematuria, and polycythemia in a long term smoker → RCC
    - Associated hematologic phenomenon? Polycythemia 2/2 epo production
    - Potential testicular phenomenon? R-sided varicocele
- Carpal Tunnel Syndrome
    - Affected nerve? Median nerve
    - Distribution? Radial 3.5 digits
    - RF?
        - Pregnancy
        - Hypothyroidism
        - RA
    - Pathophys? Compression of median nerve by flexor retinaculum
    - Dx testing prior to surgery? Nerve conduction study
    - Tx?
        - 1st step = wrist splint
        - 2nd step = corticosteroid injection
        - 3rd step = surgery
    - Provocative exam maneuvers
        - Tinnel's sign = tapping on the wrist causes sxs
        - Phalen's sign = wrist flexion for 1 min causes sxs

- Pulmonary embolism.
    - Virchow's triad = stasis + hypercoaguability + endothelial injury
    - MC EKG anomaly? Sinus tachycardia
    - Classic EKG anomaly? S1Q3T3
    - ABG findings
        - pH high (respiratory alkalosis 2/2 hyperventilation)
    - Dx?
        - Low risk pt → d-dimer
        - High risk pt → CTA
        - Pregnant pt → V/Q scan
    - Gold standard testing? Pulmonary angiography
    - Tx?
        - Stable → heparin
        - HDUS → tPA
        - HDUS with recent brain surgery → embolectomy
    - Anticoagulation review
        - Heparin
            - Mechanism? Activates AT-III → inhibiting factor X and II
            - Reversal? Protamine sulfate
        - Warfarin
            - Mechanism? Inhibits Vit K epoxide reductase
            - Reversal? Vit K + four-factor PCC
                - FFP if PCC is not an answer
        - Drop in platelets 5 days after starting heparin → STOP ALL heparin

        - Start direct thrombin inhibitor (e.g. dabigatran, argatroban)
        - Dx? anti-PF4 (platelet factor 4)
            - Confirmatory test? Serotonin release assay
- Pt with a big fracture that develops petechiae + respiratory distress → fat embolism syndrome



- Diagnosis based on EKG above? A-flutter
    - Classic EKG description? “Sawtooth” pattern
    - Acute Tx?
        - Stable → vagal maneuvers then adenosine
        - HDUS → synchronized cardioversion
    - Long-term Tx?
        - Beta blocker
        - ND-CCB

- 4 types of hypersensitivity reactions
    - Type 1 = IgE-mediated
        - Pathophys? Antigen → IgE cross-linking → mast cell degranulation
    - Type 2 = antibody mediated
        - Pathophys? Ab binds Ag → complement activation
        - Example?
            - Grave’s disease
            - Autoimmune hemolytic anemia
    - Type 3 = immune complex mediated
        - Example?
            - PSGN
            - Serum sickness
    - Type 4 = delayed
        - Example?
            - TB skin testing

- Low urine osmolality + high serum osmolality in a patient with polyuria and polydipsia who recently started taking Li. → nephrogenic DI

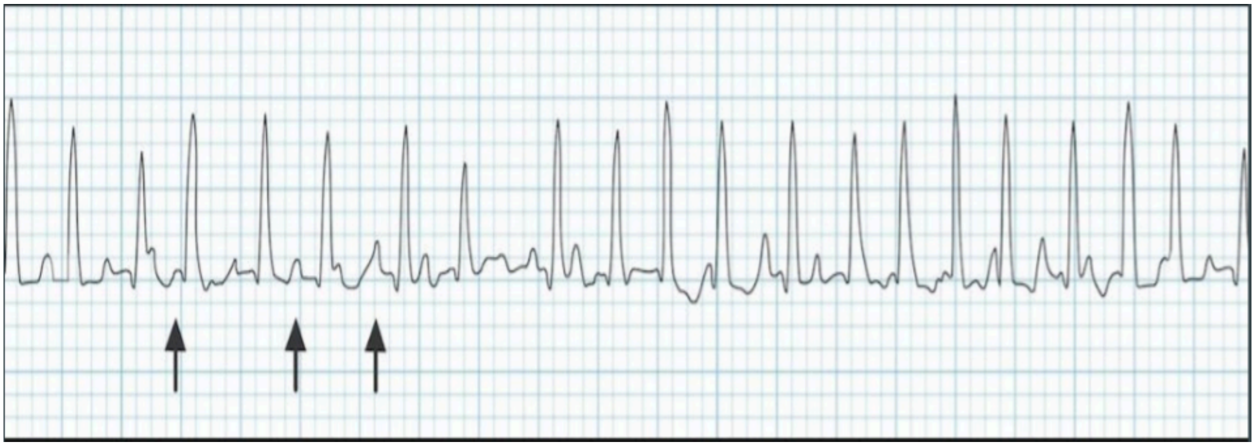
  - Tx? ENaC blockers (e.g. amiloride, triamterene)
  - Other drug cause of nephrogenic DI? Demeclocycline
  - How is this disease differentiated from psychogenic polydipsia?
    - Psychogenic polydipsia has low serum osmolality

- CD10/19/20+ + History of Down’s Syndrome + Positivity for Terminal Deoxynucleotidyl Transferase + May present as an anterior mediastinal mass in a teenager (CD3/7+) → ALL
  - Good prognosis translocation? t(12,21)
  - Bad prognosis translocation? t(9,22)

- Watery or bloody diarrhea that lasts for a few days after consuming poultry/eggs or having exposure to turtles. → Salmonella enteritidis
- High fevers in a 7 yo in a developing country + “Rose” spots on the abdomen. → Salmonella typhi
- Salmonella antibiotic coverage strategies? FQ or macrolide

- 75 yo F presents with a 2 week history of neck pain and pain in her shoulders and hips bilaterally. ESR is markedly elevated. → polymyalgia rheumatica
  - How is this differentiated from fibromyalgia? Fibromyalgia has no lab abnormalities
  - Tx PMR? Low-dose steroids
  - Tx fibromyalgia?
    - TCAs
    - Duloxetine

- Recurrent pneumonia in the same anatomic distribution in a long term smoker. → lung cancer
  - RF? #1 is smoking
  - Dx central cancer? Endobronchial ultrasound
  - Dx peripheral cancer? VATS
  - Which lung cancer is NOT amenable to surgery? Small cell
  - Type by location
    - Central → small cell, squamous cell
    - Peripheral → adenocarcinoma, large cell
  - Edema of the face/arms + dilated veins on chest wall → SVC syndrome
  - Ptosis + miosis + anhidrosis → Pancoast tumor causing Horner’s syndrome.
    - Pathophys? Tumor involvement of the sympathetic chain
  - Testing before organ resection? FEV1
    - Need to have enough pulmonary reserve to survive resection



- Diagnosis based on EKG above? Multifocal atrial tachycardia
    - Classic EKG findings? irregular rhythm with rate >100 bpm and at least 3 P wave morphologies
    - Classic “disease” and “electrolyte” associations
        - COPD
        - Hypokalemia
        - Hypomagnesemia
    - Tx? ND-CCB
    - Should propranolol be used in the treatment of this arrhythmia? NO (pt has reactive airway disease)
    - Should a patient with this arrhythmia be treated with electrical cardioversion or amiodarone? NO

- Skin lesion in the perineal region that shows up as a shiny papule with central umbilication in a patient with HIV. → molloscum contangiousum
    - Bug? Poxvirus
    - Tx? Salicylic acid
    - Transmission? contact

- Serum hypoosmolarity and urine hyperosmolarity in a patient on Carbamazepine. → SIADH
    - Common causes?
        - Drugs
            - SSRIs
            - Cyclophosphamide
            - Chlorpropamide (1st gen sulfonylureas)
        - Small cell lung cancer
    - Tx? Fluid restriction
        - If resistant to fluid restriction?
            - Demeclocycline
            - ADH receptor antagonists (-vaptans)
    - When should hypertonic saline be administered? Seizures + Na < 120
    - What happens when hyponatremia is corrected too quickly? Osmotic demyelination syndrome = central pontine myelinolysis

- Elevated serum markers in liver disease

  - hepatic pattern: AST/ALT
  - cholestatic pattern: alk phos
- Which is more specific for liver disease (AST or ALT)? ALT
- What is the classic AST/ALT ratio in alcoholic liver disease? >2:1
- In addition to alkaline phosphatase, what is a unique marker for obstructive liver lesions? GGT
- What is one HY serum marker that is somewhat unique to alcoholism? GGT

- Hemophilia A and B
  - Pathophys? Deficiency of factor 8 or 9
  - Inheritance? XLR
  - Coagulation labs?
    - Normal bleeding time
    - Elevated PTT
    - Normal PT
  - Mixing studies?
    - PTT usually corrects with mixing study
    - If it doesn't correct, inhibitor present
  - Tx? Factor concentrates
  - Contrast with lab findings in VWD
    - VWD will have elevated platelet time
  - Pattern of bleeding with platelet vs clotting factor deficiency.
    - Platelet issue → epistaxis, bleeding gums, heavy periods
    - Factor deficiency → hemarthrosis, muscle hematomas

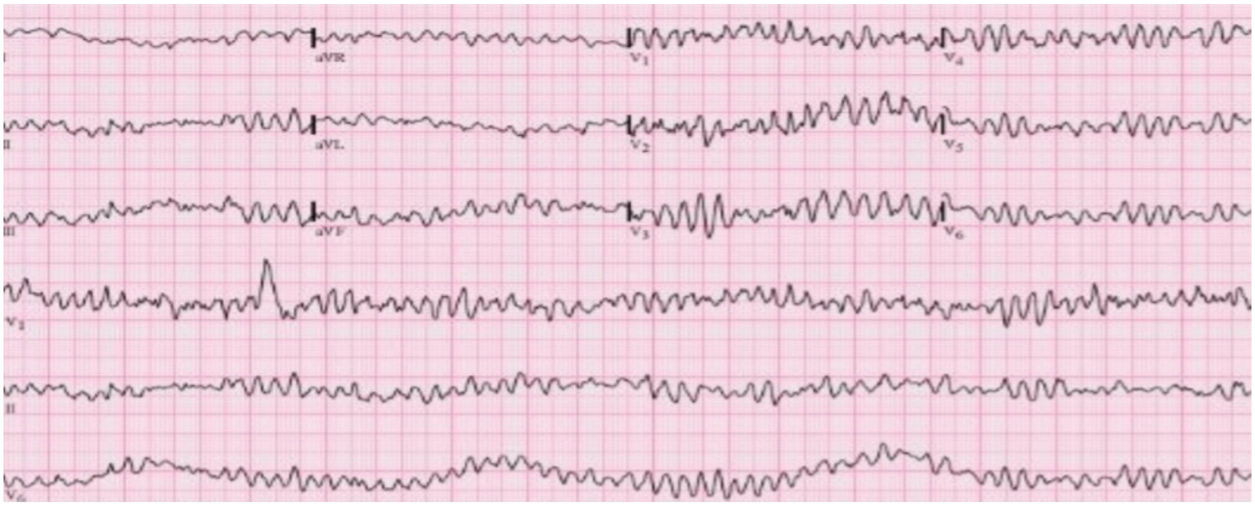
- Rice water stools leading to circulatory collapse in a peace corps volunteer visiting some African or Asian country.
  - Bug? cholera
  - Diarrheal mechanism? Secretory diarrhea
  - Tx? Oral rehydration solution
    - Mechanism? Na-glucose symporter in GI tract
- In general (rough approximation), what is the most accurate diagnostic test in gastroenteritis? Stool culture

- Renal mass in a patient with a history of cardiac rhabdomyomas and periventricular tubers. → angiomyolipoma in pt with tuberous sclerosis
  - Mutated proteins? Hamartin & tuberin

- Chondrocalcinosis observed on a knee XR in a patient with a genetic history of a C282Y mutation in the HFE gene. → CPPD in pt with hemochromatosis
  - Classic joint aspirate findings? Rhomboid-shaped, positively birefringent
    - Contrast with gout → needle-shaped, negatively birefringent
  - What is the renal disorder that has a strong association with this disease? Giletman syndrome
  - Tx?
    - 1st NSAIDs
    - 2nd steroids

        - 3rd colchicine

- Fevers, dyspnea, and joint pain in a HIV+ patient that recently went on a cave expedition in Missouri. → Histoplasmosis
    - Bug? Histoplasma capsulatum
    - CXR findings? Interstitial infiltrates
    - Tx?
        - Milder → itraconazole
        - Disseminated → amphotericin B
    - Ppx? Itraconazole when CD4 < 150
- Other prophylactic strategies in HIV+ patients.
    - Cocci → CD4 < 250 with itraconazole
    - PCP → CD4 < 20 with TMP-SMX, pentamidine, or atovaquone
    - Histo → CD4 < 150 with itraconazole
    - Toxo → CD < 100 with TMP-SMX
    - MAC → CD5 < 50 with azithro



- Diagnosis based on EKK above? V-fib
    - NBS? Defibrillation + high quality chest compressions
    - Meds? Epi + amiodarone
- MC cause of death in the immediate period surrounding an MI? V fib
- Should a person in PEA or asystole receive defibrillation? NO
- Other rhythm that we should shock? Pulseless V tach

- 19 yo F presents with a large number of small, red macular lesions on the back arranged in a “Christmas tree” distribution. She had a similar but singular large lesion 1 week ago that cleared within a few days. → pityriasis rosea
- 50 yo M presents with erectile dysfunction, gynecomastia, low libido, and loss of peripheral vision. → pituitary adenoma, like producing prolactin
    - Tx? Dopamine agonists (bromocriptine or cabergoline)
        - Surgery is NOT first-line
- Other causes of hyperprolactinemia
    - Anti-psychotics (especially risperidone)

        - Hypothyroidism
            - Pathophys? Lack of negative feedback → high TRH → TRH is a releasing factor for prolactin

- Ascites
    - Exam findings?
        - Shifting dullness at abdomen
    - SAAG gradient = serum albumin - ascites albumin
        - SAAG < 1.1 indicates absence of portal hypertension
            - Etiologies:
                - **Malignancy**
                - Nephrotic syndrome
                - Pancreatitis (pancreatic ascites)
                - Tb
        - SAAG ≥ 1.1 indicates **portal hypertension is present**
            - Etiologies:
                - **Cirrhosis**
                - Budd-Chiari
                - Right-sided HF (cardiac ascites)
        - Note: Per UW 2021 QID 4747, these are the correct answers
    - Tx? Paracentesis
        - Renal protection for large-volume paracentesis (ie > 5L of fluid drawn)? Give albumin

- Ascites with >250 neutrophils? SBP
    - NBS? Give abx (Ceftriaxone or FQ)
    - MC bug? E. coli
    - Ppx? FQ

- Tetanus
    - Pathophys? Tetanus toxic prevents release of GABA and glycine from Renshaw cells → spastic paralysis
    - Contrast with botulism, which will cause flaccid paralysis
    - Should a booster vaccination dose be given if the patient's last booster was administered 12 years ago? YES - booster q10 years
    - Acute management of the tetanus?
        - NO abx
        - Tetanus immune globulin
        - Tetanus vaccine

- Recurrent pyelonephritis and nephrolithiasis in a patient with a low posterior hairline, breast underdevelopment, and a history of aortic coarctation. → Turner syndrome
    - Associations
        - Horseshoe kidney - stuck under IMA
        - Bicuspid aortic valve

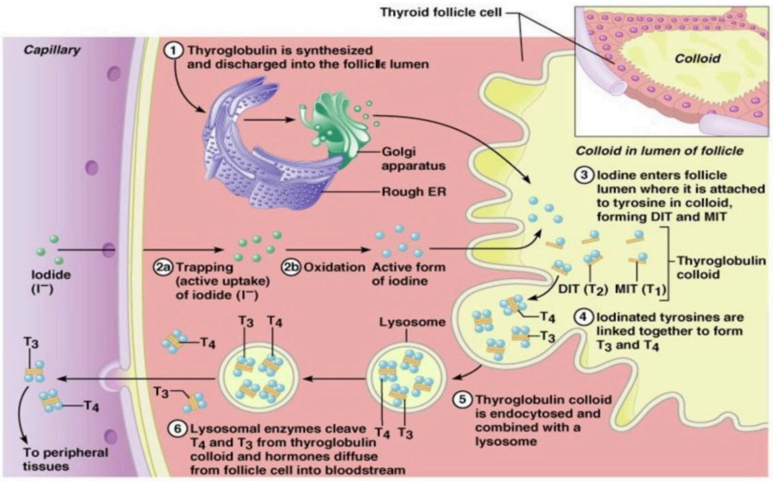
- Pleural thickening on chest CT, recurrent hemorrhagic pleural effusions, weight loss, and severe dyspnea in a patient that spent 30 years working at a shipyard. → mesothelioma
    - Does smoking increase the risk of this malignancy? NO
    - Most common lung malignancy in this population? Bronchogenic carcinoma
        - Does smoking increase the risk of this common malignancy? YES

- Broad categorization and presentation of The Acute Coronary Syndromes.
    - Unstable angina
    - STEMI
    - NSTEMI

- HPV
    - Types
        - plantar warts → HPV 1,4
        - genital warts → HPV 6,11
        - cervical cancer → HPV 16, 18, 30s
    - Transmission? Direct contact
    - Tx? Liquid nitrogen
    - Gardasil covers? 6, 11, 16, 18

- What is true of total thyroid hormone and free thyroid hormone levels in the setting of OCP use?
    - Total → increase
    - Free → normal
- Quick overview of thyroid physiology
    - Import iodine
    - Oxidize I- to I2
    - Organification (iodide to tyrosine → MIT & DIT)
    - Coupling of MIT & DIT → T3 and T4
- How can factitious hyperthyroidism be distinguished from the transient hyperthyroidism of Hashimoto’s thyroiditis (based on labs)? Thyroglobulin
    - High → Hashitoxicosis
    - Low → factitious hyperthyroidism

SYNTHESIS OF THYROID HORMONES


Thyroid follicle cell
Capillary
① Thyroglobulin is synthesized and discharged into the follicle lumen
Colloid
Golgi apparatus
Rough ER
Colloid in lumen of follicle
③ Iodine enters follicle lumen where it is attached to tyrosine in colloid, forming DIT and MIT
Iodide (I⁻)
②a Trapping (active uptake) of iodide (I⁻)
②b Oxidation
Active form of iodine
Thyroglobulin colloid
DIT (T2)
MIT (T1)
T4
T3
④ Iodinated tyrosines are linked together to form T3 and T4
Lysosome
T3
T4
T3
T4
T3
⑤ Thyroglobulin colloid is endocytosed and combined with a lysosome
⑥ Lysosomal enzymes cleave T4 and T3 from thyroglobulin colloid and hormones diffuse from follicle cell into bloodstream
T4
T3
To peripheral tissues

- Spontaneous bacterial peritonitis.
  - Bugs?
    - #1 = E. coli
    - Klebsiella
    - Strep pneumo
  - Dx? >250 PMNs on paracentesis
  - Tx? Ceftriaxone OR cipro
  - Ppx? FQ + albumin

- Microangiopathic hemolytic anemia + fever + thrombocytopenia + elevated creatinine + neurologic deficits. → TTP (thrombotic thrombocytopenic purpura)
  - Pathophys? ADAMTS13 deficiency
  - Tx? Plasma exchange

- Foul smelling diarrhea 1 week after treatment for a bacterial skin infection. → C. diff
  - Dx? Stool toxin assay
  - Tx? Oral vancomycin
    - Fidaxomicin
    - Fecal transplant
  - Prevention? Hand washing
  - A patient with the history described above deteriorates rapidly with severe abdominal pain and distension → toxic megacolon
    - NBS? surgery

- Can't see + Can't pee + Can't hear a high C. → Alport syndrome
  - Pathophys? Defect in type 4 collagen
  - Mutated gene? COL4A5
- Small cell lung cancer
  - Paraneoplastic syndrome?

        - SIADH
        - LEMS
        - ACTH
    - Tx? Chemo
        - NOT surgical candidates
- Squamous cell lung cancer
    - Paraneoplastic syndrome?
        - PTHrP
- What are the 2 peripherally presenting lung malignancies?
    - Adenocarcinoma
    - Large cell
- MC lung cancer in smokers? Squamous cell
- Most likely lung ca in a 60 yo F with no history of smoking → adenocarcinoma
- Pt with hx smoking starts to have joint pain & finger clubbing → hypertrophic osteoarthropathy (paraneoplastic syndrome associated with lung cancer)

- CP with exercise → stable angina
    - Dx? Stress test
    - Management?
        - Nitrates - decrease preload & myocardial O2 demand

- Kayser-Fleischer rings in the cornea + Parkinsonian symptoms + Liver dysfunction + Decreased serum ceruloplasmin. → Wilson's disease
    - Inheritance? AR
    - Chromosome? 13
    - Mutated gene? ATP7B
    - Tx? Penicillamine or triamterene

- Thrombocytopenia after heparin → HIT
    - Dx? anti-PF4 antibodies
    - Confirmatory test? Serotonin release assay
    - Tx? STOP heparin + give direct thrombin inhibitor
    - Is HIT a pro or an antithrombotic state? Prothrombotic

- Osteomyelitis
    - MC cause of osteomyelitis → Staph aureus
    - Osteomyelitis in a sickle cell patient → Salmonella
    - Osteomyelitis with recent history of a cat or dog bite → Pasteurella
    - Dx? MRI
    - Tx? Prolonged tx, often requires abx
        - How to determine abx sensitivity? Bone culture
    -
- **Bonus!** Is osteomyelitis in diabetics monomicrobial or polymicrobial? Polymicrobial
    - Note: Osteomyelitis = deep infection → deep foot wounds in diabetics are polymicrobial!

    - Note: **In contrast**, superficial foot wounds in diabetics are monomicrobial

- **Bonus!** Mechanism of spread of osteomyelitis in adults? Contiguous spread!

- **Bonus!** Mechanism of spread of osteomyelitis in children? Hematogenous

- Sinusitis (e.g. nasal polyps, saddle nose deformity) + hemoptysis + hematuria → Granulomatosis with polyangiitis (Wegener's)
    - Marker? c-ANCA
    - Tx? Steroids + cyclophosphamide

- Nerve Lesions
    - Surgical neck fracture of the humerus OR anterior shoulder dislocation → axillary nerve
        - Muscle? deltoid
    - Humeral midshaft fracture with wrist drop and loss of dorsal hand sensation → radial nerve
    - Medial humeral epicondylar fracture with failed finger spread + failed MCP joint flexion and IP joint extension for digits 4-5 → ulnar nerve
        - Muscles? Dorsal interossei + lumbricals

- Stress test
    - Who should get a pharmacological stress test? Can't exercise
    - Who should not get stress tests that involve EKG? Hx abnormal EKG
    - 2 pharmacological stress test methods
        - Dobutamine
        - Dipyridamole (coronary steal principle)
        - Regadenoson
    - Gold standard for CAD diagnosis → coronary angiogram (cardiac cath)
    - Principle behind stress echocardiograms? Looking for wall motion anomalies
    - Drugs to be held before stress testing? Beta blocker or ND-CCB

- Hypocalcemia + Elevated PTH + Hyperphosphatemia + Short Stature + Short 4th and 5th metacarpals + Mental retardation. → Albright hereditary osteodystrophy (pseudohypoparathyroidism)
    - Pathophys? symptoms of hypoparathyroidism despite normal or elevated PTH levels due to end-organ resistance to PTH
    - Gene? GNAS1
    - Tx? Vit D + calcium

- Hepatitis virus matching game
    - Fecal oral transmission → Hep A & Hep E
    - Depends on Hep B for transmission → Hep D
    - Virulent in pregnancy → Hep E
    - Highest risk of a chronic carrier state → Hep C
    - Transmitted by blood → Hep B & Hep C & Hep D
    - Associated with chronic disease → Hep B & Hep C

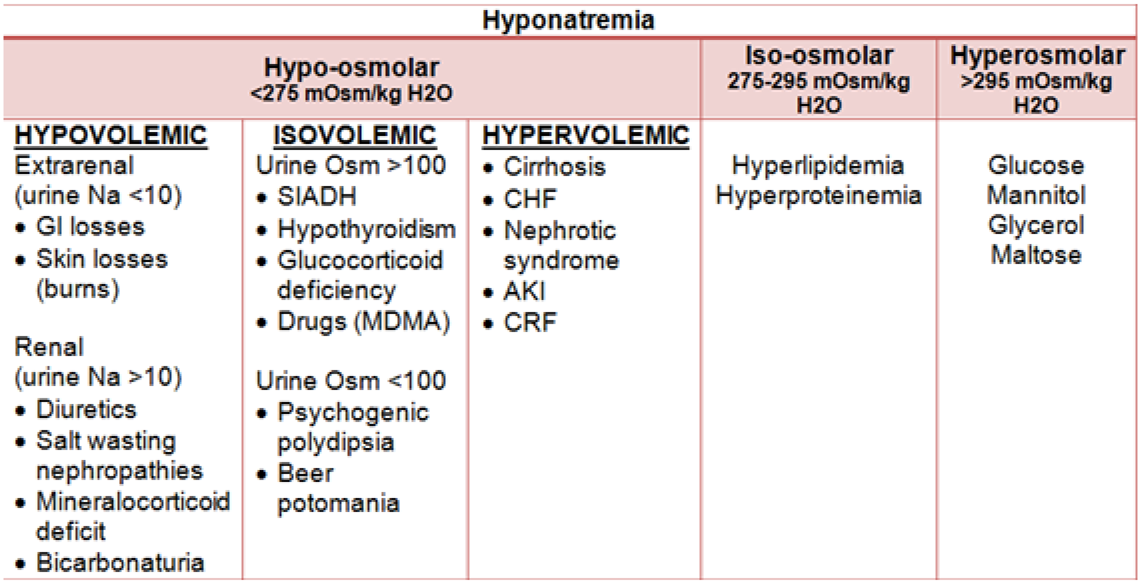
- Hep B serologies
    - General rules
        - Core Ab → exposure to virus (“scar”)
        - Surface Ag → currently infected
        - Surface Ab → has immunity (vaccine-mediated or natural)
    - Scenarios:
        - Immunized: +surface Ab
        - Prior infection (recovered): +surface Ab, +core Ab IgG
        - Acute infection: +surface Ag, +core Ab IgM, +eAg (high infectivity)
        - Chronic infection: +surface Ag, +core Ab IgG
        - Window period: +core Ab
            - Surface Ag is disappearing and surface Ab is appearing
    - Definition of chronic infection? Hep B surface Ag for > 6 months

- Recent viral infection or history of lupus + Isolated Thrombocytopenia. → ITP
    - Pathophys? Autoantibodies to GpIIbIIIa
    - Tx?
        - 1st line Steroids + IVIG
        - 2nd line spelectony
    - Should platelet transfusion ever be considered in these patients? NO
    - Drug that “replicates” the pathophysiology of the diagnosis?
        - Abciximab, eptifibatide, tirofiban
    - Deficiency that replicates the pathophysiology of the diagnosis? Glanzmann thrombasthenia
        - Ristocetin cofactor assay? normal

- 19 yo sexually active F with migratory arthritis + purpuric lesions on the lower extremities bilaterally. → disseminated gonococcal infection
    - Tx? Ceftriaxone + azithro/doxy

- Hyponatremia
    - Hyperosmolar hyponatremia
        - Pathophys? Some other osmole present
        - Causes?
            - Hyperglycemia
    - Iso-osmolar hyponatremia
        - Causes? (lab error)
            - Hypertriglyceridemia
            - Hyperproteinemia
    - Hypoosmolar hyponatremia
        - Hypervolemic
            - Causes?
                - CHF
                - Cirrhosis
                - Nephrotic syndrome
        - Euvolemic

      - SIADH
      - Hyporthyroidism
      - Psychogenic polydipsia
      - Tea & toast/beer potomania
        - Pathophys? Low solute intake
    - Hypovolemic
      - Intrarenal (urine Na > 10)
        - Diuretics
        - Barter’s/Gitelman’s
      - Extrarenal (
        - Dehydration 2/2 vomiting/diarrhea
        - Burns
  - Lab differentiation between intrarenal and extrarenal causes of hypovolemic hypoosmolar hyponatremia?
    - Urine Na > 10 → intrarenal
    - Urine Na < 10 → extrarenal
  - Distinguishing between SIADH and psychogenic polydipsia
    - Dilute urine (Uosm < 100) → psychogenic polydipsia
    - Concentrated urine (Uosm > 100) → SIADH
  - Risk of rapid Na+ correction? osmotic demyelination syndrome
  - Indications for hypertonic saline? Seizures AND Na < 120
  - Correcting Na+ for hyperglycemia? Add 1.6 for every 100 glucose over 100
    - Correction factor = 1.6 x (glucose - 100)/100



Hyponatremia				
Hypo-osmolar <275 mOsm/kg H2O			**Iso-osmolar** 275-295 mOsm/kg H2O	**Hyperosmolar** >295 mOsm/kg H2O
HYPOVOLEMIC	**ISOVOLEMIC**	**HYPERVOLEMIC**		
Extrarenal (urine Na <10) • GI losses • Skin losses (burns) Renal (urine Na >10) • Diuretics • Salt wasting nephropathies • Mineralocorticoid deficit • Bicarbonaturia	Urine Osm >100 • SIADH • Hypothyroidism • Glucocorticoid deficiency • Drugs (MDMA) Urine Osm <100 • Psychogenic polydipsia • Beer potomania	• Cirrhosis • CHF • Nephrotic syndrome • AKI • CRF	Hyperlipidemia Hyperproteinemia	Glucose Mannitol Glycerol Maltose

- Bamboo spine on XR + Stiffness relieved with exercise + HLA-B27 positive + 25 yo guy + Sacroiliitis + Anterior Uveitis. → ankylosing spondylitis
  - Tx? NSAIDs
    - 2nd line TNF inhibitor or methotrexate

- Central vs Obstructive Sleep Apnea
    - Central pathophys? Decreased respiratory drive
    - OSA pathophys? Blockage of upper airway
    - OSA RF?
        - Obesity
        - Large tonsils
    - Dx? Polysomnography
    - Tx?
        - OSA → CPAP + weight loss
        - CSA → acetazolamide
    - Surgical tx? uvulopalatopharyngoplasty
    - Complications/consequences
        - Pulmonary HTN
        - Hypoxia → Elevated Epo → Polycythemia
- Obesity hypoventilation syndrome
    - Lab findings?
        - Elevated CO2 on ABG

- Athlete collapses suddenly on the field. → HOCM
    - Inheritance? AD
    - Mutations? Sarcomere proteins
        - beta myosin heavy chain
        - myosin binding protein C
    - Classic murmur presentation? Systolic crescendo-decrescendo murmur heard at LSB
        - What other murmur is heard here? AR
    - Maneuvers that increase and decrease murmur intensity
        - Anything that increases blood in LV → decrease intensity
            - Increase preload
            - Increase afterload
    - Tx?
        - Medical? Beta blocker to increase filling in diastole
        - Surgical? Septal myectomy
    - Associated GAA repeat AR disorder? Friedrich's ataxia

- A 35 yo business man returns to the US from a trip to Mexico. He has felt unwell for the past 2 weeks with a primary presentation of flu like symptoms. Scleral icterus is observed on exam. AST/ALT is approximately 5K each. IgM antibodies specific to a single stranded picornavirus are detected in his serum. → Hep A
    - Tx? Supportive care

- Heavy menstrual bleeding + Normal PT + Elevated PTT + Increased bleeding time → Von Willebrand disease
    - Inheritance? AD
    - Pathophys? vWF deficiency
    - Why does PPT increase? vWF is a protecting group for factor 8

    - Ristocetin cofactor assay? Abnormal
    - Tx? Desmopressin
        - Mechanism? Increases release of vWF for Weibel-Palade bodies

- 25 yo F who went hiking in Oklahoma presents with a 6 day history of high fevers, headache, and myalgias. Has a rash that started on the extremities and spread inwards. Now has involvement of the palms and soles. CBC notable for low platelets. → Rocky mountain spotted fever
    - Bug? Rickettsia rickettsii
    - Tx? Doxy
        - Kids < 8 → doxy
        - Pregnancy → chloramphenicol
    - Disease with rash on palms/soles
        - Kawasaki
        - Coxsackie B
        - Rickettsia
        - Syphilis

- Acute onset exquisite pain/tenderness at the first MTP. → gout
    - Joint aspiration findings? Needle-shaped negatively bifrefringement crystals
    - Acute Tx?
        - 1st NSAID
            - NOT aspirin (decreases excretion of uric acid)
        - 2nd Steroid
        - 3rd Colchicine
        - Do not start allopurinol, but continue it if they're already on it
    - Chronic tx?
        - Xanthine oxidase inhibitors
            - Allopurinol
            - Febuxostat
        - Probenecid (increases uric acid excretion)
        - Converts uric acid to water-soluble allantoin
            - Rasburicase
            - Pegloticase
    - Tumor lysis syndrome
        - Prevention? Allopurinol
    - Drugs that increase azathioprine toxicity? Xanthine oxidase inhibitors

- 23 yo M smoker presents with a 6 month of history of mild dyspnea and productive cough. CT reveals cystonodular opacities in the upper and middle lung zones. A lung biopsy of one of the lesions is consistent with tennis shaped intracellular organelles. → Langerhans histiocytosis
    - EM findings? Birbeck granules

- Diastolic dysfunction in a patient with a history of sarcoidosis, amyloidosis, or hemochromatosis. → restrictive cardiomyopathy
    - Pathophys? Infiltration of cardiac muscle with various substances

  - Dx? echo
    - Cardiac MRI
    - Endomyocardial biopsy

- A high school student shadowing at a local hospital is mistakenly stuck by a needle from a patient who is known to have chronic Hep B infection. Testing 2 weeks ago revealed that the student was negative for all Hep B markers.
  - NBS? Give Hep B vaccine + immune globulin
  - If pt has been vaccinated? Don't need to do anything
  - Tx chronic Hep B infection? BELT
    - B = Hep B
    - E = emtricitabine
    - L = lamivudine
    - T = tenofovir

- Septic patient begins to bleed from IV Venipuncture sites. CBC is notable for elevations in PT and PTT. Fibrinogen levels and platelet count are low. A blood smear is positive for schistocytes. → DIC
  - Associated malignancy? APML
    - Histology? Aeur rods
    - Translocation? t(15,17)

- 21 yo presents with a 1 week history of fevers, fatigue, myalgias, and hemoglobinuria. She recently went hiking on a trail in Long Island, NY. Blood smear stained with Giemsa reveals "Maltese cross" shaped organisms within RBCs. → Babesia
  - Bug? Babesia microti
  - Vector? Ixodes tick
  - Tx? Atovaquone

- Differentiating between muscle strain, lumbar spinal stenosis, degenerative disk disease, and cauda equina syndrome (unique features of each)
  - Paraspinal tenderness → muscle strain
  - Pain better when leaning over → spinal stenosis
  - Sciatica + positive SLR → degenerative disk disease
  - Loss of bowel/bladder fxn + saddle anesthesia + progressive neurologic deficits → cauda equina
- 65 yo M with no past history of smoking presents with a 6 mo history of dyspnea on exertion and fatigue. Lung auscultation reveals fine crackles. DLCO is markedly decreased. → idiopathic pulmonary fibrosis
  - Key PE finding? Fine crackles
  - Dx? high-CT chest
  - Imaging finding? honeycombing

- Kind of "dysfunction" associated with dilated cardiomyopathy. → systolic
  - Common causes of DCM
    - Coxsackie B
    - Chagas
    - Anthracyclines

        - Trastuzumab
        - Alcohol (wet beriberi)
        - Postpartum cardiomyopathy
    - Extra heart sound associated with DCM? S3
    - What is the bug that causes DCM, achalasia, and megacolonosis? T. cruzii
    - Dx? Echo
    - Tx? “BAD”
        - B = beta blocker
        - A = ACE-I
        - D = diuretics

- Palpable purpura on the skin + Hypocomplementemia + Monoclonal IgM expansion in the serum + History of Hep C infection. → mixed cryoglobulinemia
    - Dx? PCR
    - Risk chronic hepatitis? Hep C > Hep B
    - Tx Hep C?
        - ledipasvir/sofosbuvir (Harvoni)
        - Pegylated interferon-alpha
            - Screen for what? depression
        - Ribavirin
    - MC cause of hepatocellular carcinoma in US? Hep C
    - Derm manifestation? Porphyria cutanea tarda
        - Pathophys? UROD

- Patient is rushed to the ED by ambulance from a restaurant after complaining of worsening respiratory difficulty and developing a diffuse rash. BP is 60/palpable. → anaphylaxis
    - NBS? IM Epinephrine
    - Type HSR? 1
    - Pathophys? IgE crosslinking → mast cell degranulation
    - Mediating chemokine? histamine

- Prerenal AKI
    - Pathophys? Hypovolemia → hypoperfusion of kidney → decrease GFR
    - Lab findings?
        - FeNa < 1%
        - Urinary Na < 20

- Tx hypovolemic hypernatremia? NS until euvolemic then correct free water deficit
- Tx hypovolemic hyponatremia? NS
- Tx hypervolemic/euvolemic hyponatremia → fluid restriction

- Drug of choice in the management of hypercalcemia of malignancy? bisphosphonates
- Bone met
    - Lytic
        - Multiple myeloma

        - Lung
        - Thyroid
        - Kidney/RCC
        - Breast
    - Blastic
        - #1 prostate
        - Breast
    - Dx? Bone scan
    - Presentation? Point tenderness over spinous process

- Bilateral patchy infiltrates in a patient with a history of chronic treatment for symptomatic VTach. → amiodarone toxicity
    - Common drug causes of pulmonary fibrosis
        - Bleomycin
        - Busulfan
        - MTX
        - Nitrofurantoin
        - Amiodarone

- Classic bug cause of hypersensitivity pneumonitis in a patient that works in a barn. → thermophilic actinomyces

- Fevers + respiratory difficulty + negative sputum cultures + bilateral micronodular consolidations on CXR in a patient with a long history of rheumatoid arthritis. → bronchiolitis obliterans organizing pneumonia
    - Tx? steroids

- What is the most important modifiable risk factor for atherosclerosis related heart disease? smoking
- Vitamin deficiencies associated with hyperhomocysteinemia
    - B12
    - B9/Folate
    - B6
- The 3 MEN syndromes
    - Inheritance? AD
    - Gene
        - MEN1 → MEN (menin protein)
        - MEN2 → RET
    - MEN 1 = “para pan pit”
        - Pituitary adenomas
        - Parathyroid hyperplasia
        - Pancreatic neuroendocrine tumors
            - MC? Gastrinoma → Z-E syndrome
    - MEN2A
        - Parathyroid hyperplasia
        - MTC
        - Pheo

    - MEN2B
        - Marfanoid habitus
            - Ddx? Marfan’s, hyperhomocysteinemia
        - Mucosal neuromas
        - MTC
        - Pheo
    - Screening for family members?
        - MEN1 → no
        - MEN2 → YES
    - Prevention of MTC? Thyroidectomy
        - 100% rick of MTC in MEN2
    - Tumor marker MTC? Calcitonin

- Esophageal varices
    - Ppx? Beta-blocker + spironolactone
- Tx of hepatic encephalopathy
    - Lactulose
        - Mechanism?
            - Prevents NH3 reabsorption in the gut
            - Lactulose metabolized by GI flora to lactic acid. Acidic environment favors NH4+, which is trapped in the colon and pooped out.
    - Rifaximin
        - Mechanism? Kills bugs that make ammonia
- What procedure increases the risk of hepatic encephalopathy? TIPS
- Spider angiomata association? Hyperestrogenism

- Pruritus after hot shower → polycythemia vera
    - Mutation? JAK2
    - Lab findings?
        - EPO low
        - Hct high
        - O2 saturation normal
    - Differentiating PV from paraneoplastic EPO secretion
        - PV → low EPO
        - Paraneoplastic → high EPO
    - Complications
        - Budd Chiari syndrome = hepatic vein thrombosis
        - Gout
    - Tx? Phlebotomy until Hct < 45% + aspirin
        - For high-risk pts (age > 60, previous thrombosis): hydroxyurea

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Ep. 32: Comprehensive Medicine Shelf Review Session 4

- Fever + absolute neutrophil count < 1500 + chronic tx for Graves disease. Dx? Agranulocytosis 2/2 PTU or methimazole
  - Tx? STOP the drug
  - Tx for neutropenic fever? Broad-spectrum abx
    - Pip-tazo
    - Carbapenem
  - Drug a/w agranulocytosis?
    - PTU/methimazole
    - Clozapine (anti-psychotic)
    - Carbamazepine (anti-epileptic)
    - Chloramphenicol

- What 2 “big-picture” mechanisms result in hypokalemia?
  - Anything that makes you volume-down →**which causes RAAS activation**
  - Anything that causes **afferent arteriole hypoperfusion** (e.g. NSAIDs which cause afferent a. vasoconstriction)

- **Which** 2 **RTA’s** cause hypokalemia?
  - Type I RTA = **defect in acid/H+ secretion** at DCT
    - DCT unable to secrete H+ → therefore, H+/K+ antiporter at DCT cannot run → so, H+ builds up inside DCT cells while K+ remains in lumen → hypokalemia
  - Type II RTA = **defect in bicarb reabsorption** at PCT
    - 2 mechanisms
      - **1.** PCT unable to reabsorb HCO3- → so, HCO3-/Na+ co-transporter at PCT cannot run → cannot take up Na+ or water → excess loss of Na+ and water from PCT *to* the tubular lumen → activation of RAAS → ↑ALDO → Na+ and water are reabsorbed more distally in nephron while K+ is secreted
      - **2.** Excess HCO3- in lumen combines with K+ in lumen → so, even less K+ is available to be taken up by nephron!

- **Which RTA** causes hyperkalemia? Type IV RTA (hypoaldosteronism → K+ builds up → hyperkalemia)

- Hypokalemia + metabolic alkalosis + unrelenting HTN (refractory to tx) → Primary Hyperaldosteronism aka Conn syndrome
    - Pathophys? Aldosterone-secreting adrenal adenoma
        - HTN is 2/2 reabsorption of Na+ and water
        - Metabolic alkalosis is 2/2 aldosterone causing upregulation of H+-ATPase
    - What candy mimics Primary Hyperaldosteronism? Licorice (i.e. glycyrrhizic acid)
        - Mechanism? Inhibits 11-betaHSD-2 → so, cortisol cannot be inactivated into cortisone → excess cortisol acts like aldosterone → hypokalemia + metabolic acidosis

- Most diuretics cause hypokalemia + metabolic [blank]? hypokalemia + metabolic **alkalosis**…

- …However, which diuretic causes hypokalemia + metabolic **acidosis**? Acetazolamide
    - MOA? CAI (carbonic anhydrase inhibitor) → results in bicarb being dumped into urine

- Genetic renal etiologies of hypokalemia?
        - Barter's syndrome – AR inheritance
        - Gitelman's syndrome – AR inheritance
        - Liddle's syndrome
            - Pathophys? Activating mutation in ENaC
            - Inheritance? AD

- EKG findings in hypokalemia? **flat T-waves** + U-waves

- 3 electrolyte imbalances that cause QT prolongation? Hypo[electrolyte]!
    - Hypokalemia

  - Hypocalcemia
  - Hypomagnesemia

- Tx for Torsade de Pointes? IV Mag

- NBSIM for hypokalemia refractory to K+ repletion? Replete magnesium!

  Best route to replete K+? Oral

- 45 yo M lifting boxes + sudden-onset radicular pain. Straight leg raise is +ve. Achilles reflex cannot be elicited. → herniated disk
  - Most likely affected nerve root? S1
  - Level of herniation? L5-S1
  - Pathophys? Herniation of nucleus pulposus → nerve root compression
  - Tx? Physical Therapy + NSAIDs
    - Bedrest and surgery not recommended

- HY Nerve Roots and associated reflex
  - C5 = triceps reflex
  - C6 = brachioradialis reflex
  - C7 = triceps reflex
  - L4 = patellar reflex
  - S1 = Achilles reflex

- Pulmonary Arterial Hypertension
  - Dx? Right-heart catheterization
    - PA pressure cutoff? **PA pressure > 25 mmHg**
  - Classic heart sound? **Loud** S2
  - Gene mutation? BMPR2
  - MCC of PAH? COPD (older adults)
    - Pathophys? Hypoxic vasoconstriction → clamping of pulmonary vessels

- Demographic for **idiopathic** PAH? Young female
  - Tx of idiopathic PAH
    - Endothelin antagonists "**—sentan**" (e.g. bosentan, ambrisentan, atrasentan)
    - PDE-5 inhibitors (e.g. sildenafil)
    - Prostacyclin analogs (e.g. iloprostol, epoprostenol)

- Lipid Screening Guidelines for CVD (i.e. dyslipidemia screening guidelines)
  - High-risk individuals → 20 yo
  - Males → 35 yo
  - Females → 45 yo

- What 4 groups of patients get statins?
  - LDL > 190
  - Existing ASCVD disease (i.e. MI, stroke, PAD)
  - 40-75 yo + ASCVD risk > 7.5%
  - 40-75 yo + DM

- Lipid-lowering drugs
  - Drug with AE of flushing → niacin
    - Tx? NSAIDs (or just wait it out)
  - Best drug to lower LDL → statins
    - Mechanism? inhibits HMG-CoA reductase
  - Best drug for lowering TGs → fibrates
    - **Note**: clinically, the best option is "fish oil"
  - Best drug to raise HDL → niacin
  - 2 drugs with AE's of hepatotoxicity and myotoxicity → statins & fibrates (esp. if given together)
    - NBSIM before prescribing statins or fibrates? Check LFTs and CK
      - Only re-check LFTs or CK if pt has sxs
  - Drug with AE of diarrhea → bile acid resins (e.g. cholestyramine, colesevelam)
  - Which lipid-lowering drug inhibits reabsorption of cholesterol at GI tract? ezetimibe

- Liver abscess + bloody diarrhea in African immigrant. → *Entamoeba histolytica*
    - Tx? Metronidazole
        - NBSIM if imaging shows well-circumscribed liver lesion? inject iodoquinol

- Tx for hydatid cysts found on liver bx? Albendazole
    - Microbe? *Echinococcus*

- Microbe that causes cholangiocarcinoma? *Clonorchis sinensis*

STI'S WITH ULCERS

- Painless ulcer + **indurated margins** + non-tender inguinal LAD → syphilis

- Painless ulcer + beefy **red base** + **slowly enlarge**s + irregular borders → granuloma inguinale
    - Microbe? *Klebsiella granulomatis*

- Painful **purulent** ulcer with soft, ragged edges → *Haemophilus ducreyi*

- Painful ulcer with **surrounding vesicular lesions** → genital herpes (HSV)
    - Tx: acyclovir (or foscarnet if resistant)

- Symptoms of syphilis
    - Primary syphilis = Painless chancre
    - Secondary syphilis = Rash on palms/soles
    - Tertiary syphilis = Argyll-Robertson pupil + Aortic regurgitation + Tabes dorsalis
        - Test to check posterior columns? Romberg test

- Dx for syphilis?
    - Screening test? RPR or VDRL (screening)
    - Confirmatory test? FTA-Abs or MHA-TP

    - Causes of false-positive screening test? Antiphospholipid syndrome

- Tx for syphilis? Penicillin G
    - Tx if penicillin-allergic? Doxy or macrolide
    - Tx if pregnant + PCN-allergic? Desensitize + Penicillin G
    - Tx if neurosyphilis + PCN-allergic? Desensitize + Penicillin G

- Hyperkalemia
    - Etiologies?
        - Potassium-sparing diuretics (“SEAT”)
            - Spironolactone or Eplerenone
            - Amiloride or Triamterene
        - ACE-I/ARBs
        - Addison’s disease aka Adrenal Insufficiency
            - Mechanism? Adrenal cortex destroyed → cannot make ALDO → K+ accumulates
        - Tumor lysis syndrome
            - Mechanism? CTx kills cancer cells → intracellular K+ gets dumped into serum
            - Kidney stones a/w tumor lysis syndrome? Uric acid stones
            - Prevention of uric acid stones? Allopurinol or Rasburicase or Pegloticase
        - Rhabdomyolysis
    - Tx?
        - **1st step = calcium gluconate**
        - Reduce serum K+
            - **Insulin + glucose** (drives K+ into cells)
            - Albuterol (SABA; activates Na+/K+ ATPase on cells)
            - Sodium bicarb
                - Mechanism? Metabolic alkalosis draws H+ out of cell while driving K+ into cells via H+/K+-ATPase pump
        - Reduce total body K+
            - Diuretics (non-potassium sparing!)

        - Kayexalate – AE: Bowel necrosis

- Pt has serum K+ of 8 with **normal** EKG → hemolyzed blood sample
    - Normal EKG, i.e. no peaked T-waves

- Chronology of EKG findings in hyperkalemia? Peaked T-waves → wide QRS → sine waves

- Wrist drop + humeral bone fracture. → radial nerve injury

- Tenderness over anatomical snuffbox. → scaphoid fracture
    - Complication? Avascular necrosis (2/2 compromised retrograde blood supply)

- Loss of lateral arm sensation + cannot abduct. → axillary nerve injury
    - 2 etiologies of axillary nerve injury?
        - **Anterior** shoulder dislocation
        - Surgical neck fracture

- COPD (emphysema; chronic bronchitis)
    - Mechanism of panacinar emphysema? alpha-1 antitrypsin deficiency
        - imbalance of anti-proteases vs. proteases (not enough anti-proteases)
            - alpha-1 antitrypsin is an anti-protease

    - PFT findings of COPD?
        - **FEV1/FVC ratio < 70%**
        - ↓ FEV1
        - ↓ FVC
        - ↑ Lung volumes
        - ↑ **TLC**

    - DLCO in chronic bronchitis vs emphysema?
        - Normal DLCO → chronic bronchitis

    - Reduced DLCO → emphysema

- Acid-base disturbance in COPD? respiratory acidosis with compensatory metabolic alkalosis
    - Mechanism? ↑CO2 (i.e. respiratory acidosis) → compensatory increase in bicarb (i.e. compensatory metabolic alkalosis)

- CBC abnormality in COPD? Polycythemia
    - Pathophys? Hypoxia → ↑EPO production

- What 2 interventions reduce mortality in COPD?
    - Smoking cessation
    - Home O2 supplementation

- What are 4 indications for supplemental home O2 in COPD?
    - O2 Sat < 88% at rest
    - PaO2 < 55
    - PAH (pulmonary hypertension)
    - Polycythemia

- Tx for acute COPD exacerbation? "ABC-O's"
    - **A**BX (azithro or levofloxacin) + **B**ronchodilators + **C**orticosteroids + supplemental **O**2

- When to give Non-Invasive Positive Pressure Ventilation (NIPPV) in acute COPD exacerbation? Pt has COPD exacerbation with **hypercapnia**

- **Step-up Tx for COPD**
    - Step 1: SAMA (ipratropium) or SABA or SAMA-SABA combination
        - GOLD Stage I or II, mild
    - Step 2: SAMA + LAMA (tiotropium) or SAMA + LABA
        - GOLD Stage I or II, severe
    - Step 3: SAMA + LAMA + ICS

            - GOLD Stage III or IV, mild
        - Step 4: SAMA + LAMA + ICS + PDE-4 inhibitor (roflumilast)
                - GOLD Stage III or IV, severe
            - MOA PDE-4 inhibitors? Smooth muscle relaxation → bronchial muscle relaxation
        - Step 5: SAMA + LAMA + ICS + PDE-4 inhibitor + oral steroids

    - Why is mechanical ventilation with **SpO2 ~99%** contraindicated in COPD? B/c COPD pt's depend on hypoxic respiratory drive
        - Mechanism? COPD pt's chronically retain high CO2 → so, respiratory drive switches from hypercapnia-driven respiratory drive to hypoxia-driven respiratory drive → now COPD pt's depend on hypoxia to drive respiration → if supplemental O2 causes COPD pt's to reach high SpO2, the body no longer thinks it is in hypoxia → thus hypoxic respiratory drive is shut off → no more respiration
            - **Note**: In contrast, hypercapnia-driven respiratory drive is done non-COPD pt's

- HTN
    - Dx? BP **> 130/80** on TWO occasions
        - Gold standard Dx? 24h ambulatory monitoring
    - Lifestyle modifications for HTN (from most to least effective)?
        - **Weight loss** (most effective) >> DASH diet > exercise > Na+ restriction (least effective)

- Special anti-hypertensive indications
    - Tx for HTN + DM → ACE-I
    - Tx for HTN + CKD → ACE-I
    - Tx for HTN + HF or hx MI → ACE-I
    - Tx for HTN + hx kidney stones → thiazides
    - Tx for HTN + BPH → non-selective alpha-1 blocker (e.g. prazosin, not tamsulosin)
    - Tx for HTN in African-American with no other conditions → thiazides
    - Tx for HTN in African-American plus DM or HF or hx MI → ACE-I
    - Pregnant → hydralazine or labetalol or methyldopa or nifedipine

        - "**H**e **L**ikes **M**y **N**eonate"

- 2 major contraindications to ACE-I's
    - Anatomic contraindication to ACE-I → Bilateral renal artery stenosis
    - Enzyme contraindication to ACE-I → C1 esterase inhibitor deficiency

- **Fever** + abdominal pain + **left** shoulder pain + pleural effusion on CXR + **recent small bowel surgery**. Dx? **Subphrenic abscess**
    - Pathophys? Phrenic nerve causes referred pain to **left** shoulder

- Antidotes for anti-coagulants
    - Heparin antidote → protamine sulfate
    - Dabigatran antidote → idarucizumab
    - Warfarin antidote → Vit K & 4-factor PCC

- Tx for heparin-induced thrombocytopenia (HIT)? Direct thrombin inhibitor (**dabigatran**)
    - Note: Do not give LWMH in HIT

- Which anticoag to give for valvular AFib? Warfarin
    - "**VAL**erie **WAR**ring against **AFib**"
        - Note: Do not give dabigatran or bivalirudin in **valvular** AFib!

- Recurrent **seizures** + recent trip to South America + **consumed pork** → neurocysticercosis
    - Microbe? *Taenia solium*
    - Tx for neurocysticercosis? Anti-epileptic (phenytoin) + Albendazole + corticosteroids
        - Per UW and MedBullets
    - Tx for *Taenia solium* localized to GI tract? Praziquantel
        - Per UW and MedBullets

- Hypercalcemia
    - MCC of hypercalcemia? Primary hyperparathyroidism (parathyroid adenoma)

    - Other etiologies of hypercalcemia?
        - Drugs? Thiazides
        - General ilness? Malignancy
    - S/sx of hypercalcemia? “Stones, bones, groans, psychiciatric overtones”
    - EKG findings? Shortened QT
    - First step in management of symptomatic hypercalcemia? Fluids

- Urine Ca2+ in Primary Hyperparathyroidism vs FHH?
    - ↑ Urine Ca2+ = primary hyperparathyroidism
    - ↓ Urine Ca2+ = FHH

- Tx for hypercalcemia of malignancy? Bisphosphonates
    - 4 different criteria for parathyroidectomy in 1° hyperparathyroidism?
        - Symptomatic
        - Age < 50 yo
        - Ca2+ > 1 mg/dL over ULN
        - Renal dysfunction

Primary Hyperparathyroidism	**Secondary Hyperparathyroidism**	**Tertiary Hyperparathyroidism**	**Familial Hypocalciuric Hypercalcemia**	**Hypercalcemia of Malignancy**	**Liver Disease**	**Milk Alkali Syndrome**
• ↑ PTH • ↑ Ca^{2+} • ↓ $PO4^{3-}$ • ↑Urine Ca2+ Problem at PTH gland	• ↑ PTH • ↓ Ca^{2+} • ↑ $PO4^{3-}$ Seen in kidney failure	• ↑ PTH • ↑ Ca^{2+} • ↓ $PO4^{3-}$ Pt with kidney transplant **Note**: Labs mirror 1° HyperPTHism, **but** vignette for 3° HyperPTHism will state pt had a **kidney transplant**	• ↑ PTH • ↑ Ca^{2+} • ↓ Urine Ca2+ • ↓ $PO4^{3-}$ Benign **Note**: Labs mirror 1° HyperPTHism but the distinguishing lab is FHH causes ↓ Urine Ca2+	• ↑ PTH-rp • ↓ PTH • ↑ Ca^{2+} • ↓ $PO4^{3-}$ Tx = bisphosphonates **Note**: PTH-rp acts exactly like PTH, which is why there is ↓$PO4^{3-}$	• ↑ PTH • ↓ Ca^{2+} • ↓ $PO4^{3-}$	• ↓ PTH • ↑Ca^{2+} Seen in Ca2+ toxicity

- Acid-base disturbance for pH 7.25 + pCO2 65 + HCO3- 29? Respiratory acidosis + compensatory metabolic alkalosis
    - 2 associated drug overdoses? Opioids overdose and benzo overdose
    - Associated lung disease? COPD

- Pathophys of HTN in patient with Turner's syndrome? coarctation of aorta

- HTN + hypokalemia + metabolic alkalosis + ↑ aldosterone:renin ratio. → Primary Hyperaldosteronism aka Conn syndrome
    - Tx? Spironolactone then surgery (give spironolactone before surgery)

- Episodic HTN + headaches. → pheochromocytoma

- HTN in 36 yo sexually active F. Drug association? OCPs

- HTN in patient on long-term NSAID tx for osteoarthritis. → RAAS activation (2/2 renal dysfunction)

  - Mechanism? NSAIDs cause afferent arteriole vasoconstriction → hypoperfusion of glomerulus → RAAS activation

- HTN in 25 yo F with abdominal bruit → fibromuscular dysplasia

- HTN in 70 yo M with abdominal bruit + AV nicking on fundoscopic exam → renal artery stenosis

- 70 yo F with Ca^{2+} of 12.9 + SCr of 3 + Hb of 8 + bone pain + lytic bone lesions on XR → multiple myeloma
  - Sxs of multiple myeloma? "CRAB"
    - hyper**C**alcemia
    - **R**enal failure (elevated SCr)
    - **A**nemia
    - **B**one pain/bone lesions (lytic)
  - Dx? M-spike on SPEP or UPEP
    - **Note**: "M-spike" = ↑ in monoclonal Ig
      - There is an M-spike in MM, MGUS, and Waldenstrom Macroglobulinemia
  - Blood smear findings? Rouleaux formation
  - Bone marrow bx? > 10% plasma cells
  - Tx multiple myeloma? Bortezomib
    - MOA? Proteasome inhibitor → junk proteins accumulate → this kills MM cancer cells

- Plasma-cell levels in multiple myeloma vs MGUS?
  - MM → >10% plasma cells on bone marrow bx
  - MGUS → <10% plasma cells on bone marrow bx

- Does MGUS present with "CRAB" sxs? No!
  - Prognosis of MGUS? 1% of MGUS cases progress to MM every year

- How to DDx MGUS vs Waldenstrom Macroglobulinemia?
  - M**G**US = small Ig**G** monoclonal gammopathy

  - WaldenstroM MACROglobulineMia = IgMMM monoclonal gammopathy
    - WaldrenstroM MACROglobulineMia ← IgM is a pentamer, so it's huge/macro!
    - Complications? Hyperviscosity syndrome

- **Cyclical fevers** + **anemia** + headaches + **hepatosplenomegaly** + **recent trip to Africa**. → Malaria
  - Microbe? *Plasmodium* species
    - Microbe that causes most severe form of malaria? *Plasmodium falciparum*
  - Vector? Anopheles mosquito (female mosquitoes)
  - Dx? **Thick & thin blood smear** on Giemsa Strain
    - Stain? Giemsa
  - *Plasmodium* species a/w hypnozoites*? Plasmodium vivax* and *Plasmodium ovale*
    - Tx for hypnozoite forms? Primaquine
  - Tx?
    - Chloroquine – high rates of resistance
    - Mefloquine – MC PPx
    - Primaquine – AE: hemolysis in G6PD deficiency
    - Atovaquone
    - Artemether/lumefantrine

- Prolonged QT + carpopedal spasms on manual BP checks after thyroidectomy for papillary thyroid cancer. → hypocalcemia 2/2 parathyroid removal

- Prolonged QT + carpopedal spasms on manual BP checks after receiving 9U of blood for severe hemorrhage → EDTA-induced chelation of Ca^{2+} (EDTA is found in packed RBCs)

- Hypocalcemia
  - EKG finding? QT prolongation
  - Tx? Calcium + Vit D
    - NBSIM when hypercalcemia is refractory to Ca2+ repletion? Give magnesium

- Serum Ca^{2+} and PO_4^{3-} labs in CKD? **hypocalcemia** + high serum $PO4^{3-}$

    - **Remember**: CKD = 2º Hyperthyroidism!

- Serum Ca^{2+} and PO_4^{3-} labs in Liver Disease? **hypocalcemia** + low serum $PO4^{3-}$.

- Serum Ca^{2+} and PO_4^{3-} labs in Vit. D deficiency? **hypocalcemia** + low serum $PO4^{3-}$.

- Which causes hypocalcemia: metabolic acidosis or metabolic alkalosis? Metabolic alkalosis
    - "Metabolic alkaLOWsis" = LOW calcium
    - Mechanism? Metabolic alkalosis causes excess negative charges on albumin → albumin binds up more serum Ca^{2+}

- Pt has hypercapnia + RR of 8 + multiple rib fractures. NBSIM? Pain control (e.g. nerve block)
    - Why? Pt's with rib fx's are hypo-ventilating to avoid pain on inspiration → nerve block will control pain to allow pt's to breathe more comfortably

- Should rib fractures be casted? NO

- pH 7.52 + pCO2 31 + HCO3- 24. Acid-base disturbance? respiratory alkalosis
    - Etiology? Hyperventilation

- Acid-base disturbance in aspirin overdose? Respiratory alkalosis + metabolic acidosis
    - Hyperventilation → respiratory alkalosis
    - Aspirin aka Salicylic acid → AG metabolic acidosis

HYPONATREMIA

Hyper-Osmolar Hyponatremia

- MC Etiology? Hyperglycemia (e.g. DKA or HHNS)
- Pathophys? Excess glucose aka excess osmoles in serum → draws water *out* of cells and *into* extracellular space → serum sodium concentration becomes diluted
- Formula to calculate corrected Na+ in hyperglycemia?
    - Corrected Serum Na+ =

        - E.g. Serum Na+ of 120 and blood glucose of 1000
            - Corrected Serum Na+ = [120] + [1.6 x [(1000 - 100)/100]) = 134

Iso-Osmolar Hyponatremia

- Etiologies? Hyperlipidemia and hyperproteinemia
    - Mechanism? Lab artifact (lab error)

Hypo-Osmolar Hyponatremia

Q: Next step after determining pt has hypo-osmolar hyponatremia?

A: Assess volume status, i.e. hypervolemia vs euvolemic vs hypovolemic

- **Hypervolemic Hyponatremia** (Hypo-osmolar Hypervolemic Hyponatremia)
    - Mechanism? Activation of both **RAAS and ADH** → reabsorb way more water than Na+
        - ADH only absorbs water → this is why more water is reabsorbed than Na+
        - More details: ↓intravascular volume → hypoperfusion detected at afferent arteriole → activation of RAAS + ADH * → ↑Na+ uptake and ↑water uptake, but gain more water than Na+ b/c ADH only draws in water
            - *Non-osmotic release of ADH 2/2 hypovolemia
    - Etiologies? Anything that results in hypoperfusion at afferent arteriole
        - Cirrhosis – Urine Na+ < 10
        - Right-sided heart failure – Urine Na+ < 10
        - Nephrotic syndrome – Urine Na+ < 10
        - Kidney failure – Urine Na+ > 10
            - b/c kidneys unable to concentrate urine appropriately
    - Tx? Restrict fluids

- **Euvolemic Hyponatremia** (Hypo-osmolar Euvolemic Hyponatremia)
    - Pathophys? Pt only gaining water (pt originally had normal Na+ serum)
        - Why doesn't the pt become hypovolemic? ↑Water intake → ↓ serum osmolality → water redistributes *into* cells, so serum volume remains stable
    - Etiologies?

        - SIADH – ↓Serum OsM + ↑ Urine Osm (> 100)
        - Psychogenic polydipsia (compulsive water drinker) – ↓Serum OsM + ↓ Urine Osm (< 100)
        - Hypothyroidism
        - Beer potomania/tea-and-toast diet

    - Tx? Fluid restriction

- **Hypovolemic Hyponatremia** (Hypo-osmolar Euvolemic Hyponatremia)
    - Mechanism? Pt loses more Na+ than water
        - Exacerbated by rehydrating with pure water
    - Etiologies?
        - Loop diuretics (i.e. due to Na^+-dumping into urine)
            - Urine Na^+ > 10
        - Vomiting/diarrhea (loss of electrolyte-rich fluid)
            - Urine Na^+ <10
        - Addison disease
    - Tx? Normal Saline aka 0.9% NS

HYPERNATREMIA

- **Hypervolemic Hypernatremia**
    - Mechanism? Net gain of Na+ in excess of water
    - Etiologies?
        - Infusion of Na+-containing abx
        - Excess infusion of sodium bicarb
        - Excess ingestion of NaCl
        - Primary hyperaldosteronism
    - Tx? NS until euvolemic then D5W or 0.45% saline

- **Hypovolemic Hypernatremia**
    - **Mechanism?** Net loss of water in excess of loss of Na+
    - Etiologies?

        - Osmotic diuresis (glucosuria, mannitol)
        - Sweating
        - Diarrhea, i.e. osmotic-laxative diarrhea, lactase deficiency)
        - Vomiting
    - Tx? NS until euvolemic then D5W or 0.45% saline
- **Euvolemic Hypernatremia**
    - Mechanism? Net loss of only water, i.e. pure water loss (no loss of Na+)
    - Etiologies?
        - Fever (insensible water loss)
        - Diabetes insipidus
    - Tx? D5W

- CP at rest = unstable angina
    - Alternate presentation? CP with progressively less exertion
    - ST elevation preset? no
    - Troponin elevation present? no
    - DDx unstable angina vs NSTEMI?
        - NSTEMI causes elevated troponin
    - Tx unstable angina? Nitrates + statins + aspirin + beta blocker + ACE-I
        - O2 supplementation only if hypoxic
        - Are fibrinolytics ever indicated? NO!
            - How about for NSTEMI? In general, no

- Vitamin deficiencies and complications a/w chronic pancreatitis or other etiologies of fat malabsorption?
    - Vit A deficiency → blindness
    - Vit D deficiency → hypocalcemia, hypophosphatemia, secondary hyperparathyroidism
    - Vit E deficiency → hemolytic anemia, acanthocytosis, ataxia
    - Vit K deficiency → bleeding

- Genetic disease associated with skin necrosis with initiation of warfarin tx? Protein C/S deficiency

- Watery foul-smelling diarrhea + recent hiking/camping trip. → *Giardia*
    - Dx? Stool O&P
        - trophozoites or cysts in the stool
    - Tx? Metronidazole
    - Immunodeficiency a/w Giardiasis? IgA deficiency

- MCC of chronic hyperphosphatemia → CKD

- Tx for hyperphosphatemia? Sevelamer (mechanism: phosphate binder)

- Electrolytes that spill into the circulation with tumor lysis syndrome and rhabdomyolysis?
    - Hyperkalemia
        - EKG findings? Peaked T → wide QRS → sine wave → asystole
    - Hyperuricemia

- Most important electrolyte abnormality in refeeding syndrome? Hypophosphatemia

- **Hypophosphatemia** + **muscle weakness** + **arrhythmias** after re-introduction of nutrition in pt with chronic malnourishment → Refeeding syndrome
    - Chronically malnourished, e.g. pt with cancer!

- MC shoulder dislocation: anterior or posterior? **Anterior** shoulder dislocation
    - Affected nerve and artery? Axillary nerve and posterior humeral circumflex artery

- Etiologies of *posterior* shoulder dislocation?
        - Less common than anterior shoulder dislocations!
    - Seizures
    - Lightning strike

- MC hip dislocation: anterior or posterior? Posterior hip dislocation

    - “HP computers” = hip dislocates posterior

- Cystic fibrosis.
    - Mutated gene? CFTR
        - MC mutation? Delta F508
    - Inheritance? AR
    - Pathophys? Thick secretions due to dysfunction of Cl- channel
        - In non-CF pt’s, water follows Cl-, which thins mucus secretions
    - Causes of pneumonia by age?
        - < 20 yo = *Staph aureus*
        - > 20 yo = *Pseudomonas*
    - Dx? Sweat chloride test
        - Serum trypsinogen (low due to obstruction of pancreatic ducts by thick secretions)
    - Tx?
        - N-acetylcysteine (breaks disulfide bonds → mucolytic)
        - DorNase Alfa (helps thin out mucus)
        - Nebulized tobramycin
        - Chest physiotherapy
        - Vit ADEK supplementation
        - Nutritional support (high calories!)
    - Associations
        - Nasal polyps
        - Rectal prolapse
        - Congenital absence of vas deferens

- 25 yo F smoker + **severe chest pain** at night + **migraines**. → Prinzmetal angina = variant angina
    - Pathophys? Vasospasm of coronary arteries
    - Dx? Provocative testing w/ ergotamine in the cath lab
        - If pt has ST elevations & elevated troponins → cath lab
    - Tx? CCB (per UTD, diltiazem or amlodipine)

    - Contraindicated drugs
        - Sumatriptan
        - Ergots
        - Non-selective beta blockers (e.g. propranolol)
            - b/c they exacerbate vasospasm

- Severe anal pruritus in child. Microbe? *Enterobius vermicularis* (pinworm)
    - Dx? Scotch tape test
    - Tx? Albendazole or pyrantel pamoate

- 65 yo F with signs of pancytopenia. Bone marrow bx shows > 20% blasts. Cells are **positive for myeloperoxidase**. **Auer rods** are found on biopsy. Dx? APML
    - Translocation? t(15,17)
    - Tx? ATRA (all-*trans*-retinoic acid)
    - Serious complication of APML? DIC
        - DIC labs? Normal PT + elevated PTT + elevated bleeding time + low platelets

- Protozoal a/w bloody diarrhea and liver abscesses? → entamoeba histolytica
    - Tx? metronidazole
        - If abscess? Inject iodoquinol

- Microbe that increases risk of cholangiocarcinoma? *Clonorchis sinensis*

- Hypoxemia with normal A-a gradient
    - Hypoventilation
    - High altitude

- Etiologies of hypoxemia with elevated A-a gradient?
    - Right-to-left cardiac shunt
    - V/Q mismatch (i.e. pulmonary embolism)
    - Diffusion issue (e.g. pulmonary fibrosis)

- EKG leads and associated MI and artery occlusion.
    - Leads II, III, avF = inferior MI + RCA occlusion
    - Leads I, aVL, V5, V6 = lateral MI + LCX occlusion
    - Leads V1-V4 = anterior MI + LAD occlusion

- Drug class contraindicated in right-sided MI? nitrates
    - These pts are preload dependent

- Most sensitive lab marker for MI? cTn (cardiac troponin)

- Most sensitive lab marker to diagnose reinfarction in setting of recent MI? CK-MB (short half-life)

- **75 yo** M with recurrent infections. CBC shows lymphocytes of 109,000. PEx reveals anterior and posterior cervical lymphadenopathy. Blood shows **smudge cells** that are **CD5/CD19/CD20/CD21 +ve.** Dx? CLL
    - Prevention of tumor lysis syndrome?
        - Allopurinol
        - Rasburicase or pegloticase

- Watery diarrhea after eating oysters. Microbe? *Vibrio parahaemolyticus or Vibrio vulnificus*
    - Tx? Doxycycline
    - Demographic at risk of severe infection? Liver disease (*Vibrio vulnificus,* specifically)
    - Other sxs of *Vibrio vulnificus* infection? Severe cellulitis or necrotizing fasciitis

- Pt on eclampsia prophylaxis. Now has 2/5 patellar reflexes. Had 5/5 patellar reflexes a few hours ago. Toxicity? Magnesium toxicity
    - Sequence of sxs due to Mag toxicity?
        - Hyporeflexia → respiratory depression → arrhythmia
    - Tx? Calcium gluconate

- PTH levels depend on Magnesium levels

        - High Mag → low PTH (acts on CSR)
        - Low Mag → high PTH
            - Recall the hypomagnesemia-hypocalcemia association
        - Very low Mag → low PTH

- What 2 electrolyte abnormalities cannot be corrected if there is concurrent hypomagnesemia? Hypokalemia and hypocalcemia

- DDx cardiogenic pulmonary edema vs noncardiogenic pulmonary edema
    - Cardiogenic pulmonary edema
        - PCWP > 18 mmHg (elevated PCWP!)
        - Tx? Furosemide + inotrope (e.g. digoxin, dobutamine, milrinone)
    - Noncardiogenic pulmonary edema
        - PCWP < 18 mmHg (normal PCWP!)
        - Classic etiology? ARDS

- Pt has MI and the closet hospital where PCI can be done is 30 mins away. NBISM? Transport!
    - What if nearest hospital is **>** 2h away? tPA!
        - Contraindications to tPA? Recent ischemia stroke or recent brain surgery

- Always do PCI if nearest PCI-capable hospital is < 2h away
    - Give tPA if nearest PCI-capable hospital is >2h away

- Tx for left main coronary artery stenosis or 3-vessel disease? CABG

- Acute MI management
    - **1st step: Aspirin**
    - Morphine
    - O2 supplementation if hypoxic
    - Beta-blockers
    - Nitrates

  - ACE-I
  - Statin
  - Heparin

- Brush border enzyme deficiency in Asian immigrant with abdominal pain and bloating after consuming cheese. → Lactose intolerance
  - Pathophys? lactase deficiency
  - Dx? Hydrogen breath test (↑ H+ ions)

- Abdominal discomfort + pancytopenia + dry tap on bone marrow bx + cells that stain +ve for Tartrate Resistant Acid Phosphatase + lymphoid cells with fine cytoplasmic projections on histology. → Hairy cell leukemia

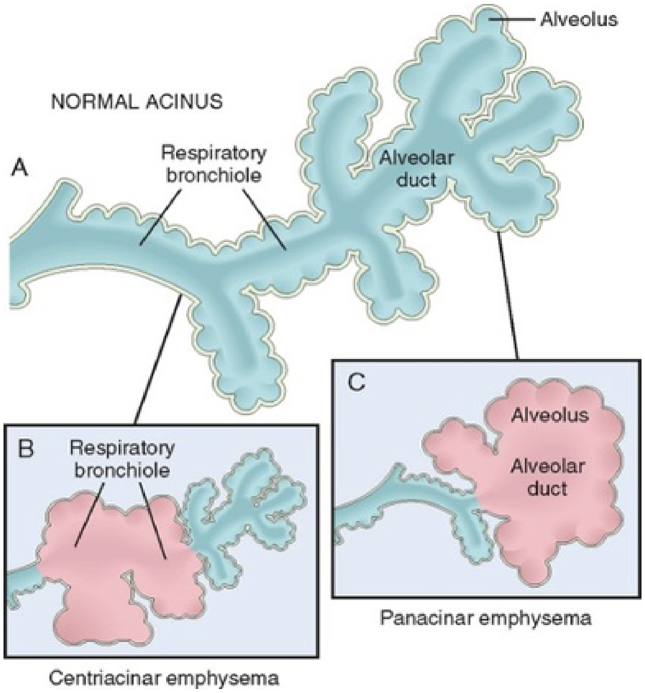
- Watery diarrhea and severe vomiting for a 3 day period after consuming fried rice at a Korean restaurant. → *Bacillus cereus*

- Pt with history of HBV + asymmetric neurological deficits + weight loss + severe abdominal pain after meals + ANCA-negative + segmental transmural inflammation on renal angiography. Dx? polyarteritis nodosa
  - **Note:** lungs are unaffected in polyarteritis nodosa
  - Dx? Sural nerve biopsy

- Primary Spontaneous Pneumothorax vs Tension Pneumothorax.
  - Primary spontaneous pneumothorax
    - Classic demographics?
      - Tall skinny male
      - Emphysema
  - Tension pneumothorax
    - Classic demographics?
      - Trauma pt (e.g. chest stabbing)
      - Ventilated pt (2/2 barotrauma)
      - Central line placement, i.e. lung gets punctured

        - Auscultation?
            - Decreased breath sounds on affected side
            - Hyperresonant to percussion
    - Tx stable pt → O2 & observe
    - Tx unstable pt → **needle thoracostomy** then **chest tube** at 2nd mid-clavicular line at **top** of ICS
        - Where? 2nd intercostal space at midclavicular line
        - Bottom or top of intercostal space? Top (b/c intercostal nerve/vein/artery run along bottom of ribs)

- Emphysema
    - RF
        - Centriacinar emphysema = smoking
        - Panacinar emphysema = alpha-1 antitrypsin deficiency


Alveolus
NORMAL ACINUS
A
Respiratory bronchiole
Alveolar duct
B
Respiratory bronchiole
C
Alveolus
Alveolar duct
Panacinar emphysema
Centriacinar emphysema

    - Imaging findings?
        - Hyperinflation aka flattened diaphragms
        - Bullae

    - PFT's?
        - FEV1/FVC < 70%
        - FEV1 decreased
        - FVC decreased
        - Lung volumes increased
        - TLC increased
        - DLCO?
            - Normal DLCO → chronic bronchitis
            - Decreased DLCO → emphysema

    - What is GOLD staging? Staging used to categorize pulmonary function in COPD pt's
        - GOLD staging dictates tx in COPD

    - GOLD Stages

        - GOLD I = FEV1 > 80%
        - GOLD II = FEV1 50-80%
        - GOLD III = FEV1 30-50%
        - GOLD IV = FEV1 < 30%

    - Step-up of Tx in COPD based on GOLD staging
        - Step 1: SAMA (ipratropium) or SABA or SAMA-SABA combination
            - GOLD Stage I or II, mild
        - Step 2: SAMA + LAMA (tiotropium) or SAMA + LABA
            - GOLD Stage I or II, severe
        - Step 3: SAMA + LAMA + ICS
            - GOLD Stage III or IV, mild
        - Step 4: SAMA + LAMA + ICS + PDE-4 inhibitor (roflumilast)
            - GOLD Stage III or IV, severe

    - Interventions to decrease mortality in COPD?
        - Smoking cessation
        - Home O2

- Key difference b/w asthma vs emphysema Tx?
    - Asthma = first ICS **then** LABA
    - COPD = first LAMA/LABA **then** ICS

- 2 Interventions to increase survival in COPD? Smoking cessation and Home O2

- What is Cor Pulmonale? Right-heart failure 2/2 PAH
    - PAH is when PA pressure > 25 mmHg

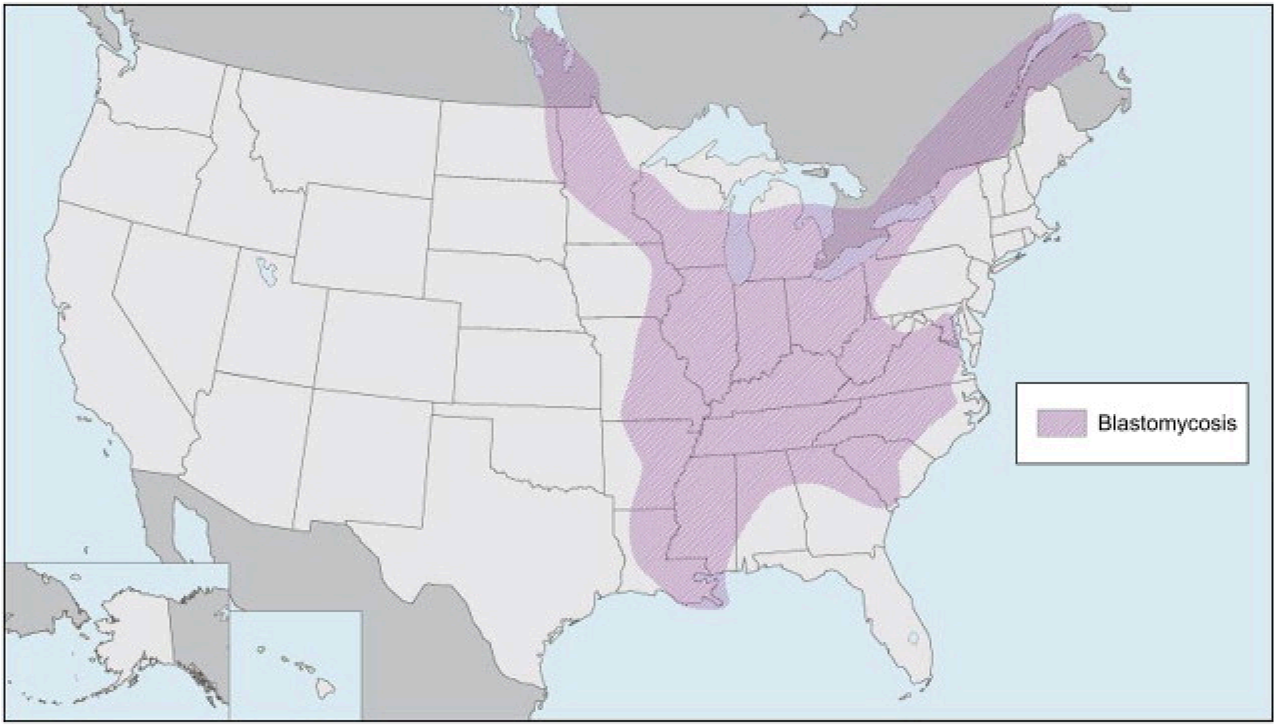
- Pneumoconiosis
    - Are PFT's obstructive or restrictive? Restrictive lung pattern
        - FEV1/FVC

    - MC pneumoconiosis? Asbestosis
        - Upper or lower lobes affected? **Lower lobes**
            - **Note**: all other pneumoconiosis affect *upper* lobes
            - "Roofs (asbestosis in roofs) affect lower lobes, ground affects upper"
        - Imaging findings? Pleural plaques
        - Histo? Ferruginous bodies
        - MC malignancy? Bronchogenic carcinoma
        - Thoracentesis presentation of mesothelioma? Hemorrhagic pleural effusion

- Pt has rheumatoid arthritis + pneumoconiosis. Dx? Caplan syndrome

- Which pneumoconiosis is a/w increased risk of Tb? Silicosis

- Interstitial infiltrates on CXR + sputum shows **broad-based budding yeasts** + hemoptysis/productive cough/SOB + **resident of Wisconsin** or Indiana + **gray-colored** skin lesions. → Blastomycosis
    - Tx for pulmonary blastomycosis? Itraconazole
        - Tx for disseminated Blastomycosis? Amphotericin B
    - Highest infection rate in Wisconsin!



- **Hospitalized** patient develops fever + diarrhea. → *C. diff* colitis

- Endocarditis in patient with prosthetic valves. → *Staph epidermidis*

- ICU pt has fever + history of alcoholism. → *Klebsiella* aspiration pneumonia

- Common causes of drug-induced fever? → ABX & heparin

- Classic imaging and LP findings in HSV encephalitis?
    - Imaging finding? Temporal lobe enhancement
    - LP? RBCs in 500's (in the 100's but less than 1000!)

- Drugs that cover *MRSA*
    - Vanc
    - Daptomycin
    - Clinda
    - Linezolid

    - Ceftaroline
    - Doxy
    - TMP-SMX

- Drugs that cover *Pseudomonas*
    - Ceftazidime
    - Cefepime
    - Pip-tazo
    - FQ
    - Carbapenems
    - Aztreonam
    - Aminoglycosides

- Tx for *Neisseria* infection? Ceftriaxone

- What 2 drug combinations for coverage of most abdominal infections?
    - Cipro + metro
    - Metro + amoxicillin + gentamicin

- Simple UTI management
    - Nitrofurantoin
    - TMP-SMX
    - Cipro

- Tx for pyelonephritis? Ceftriaxone

- Tx for Community acquired pneumonia?
    - Ceftriaxone
    - Azithromycin
    - Levofloxacin

- Tx for Rocky mountain spotted fever? **Doxycycline** (or chloramphenicol if pregnant)

- Tx for syphilis? Penicillin G
    - Desensitize if allergic!

- Tx for flu in first 48 hours of symptom onset? oseltamivir

- HY AEs of antibiotics
    - Vancomycin
        - Red man syndrome
        - Nephrotoxicity
        - Ototoxicity
    - Gentamicin
        - Nephrotoxicity
        - Ototoxicity
    - Penicillins
        - Hypersensitivity rxn
        - AIN

- AEs of HIV drugs
    - HIV drug with AE of fat redistribution or metabolic syndrome? ritonavir/protease inhibitors
    - HIV drug with AE of nephrolithiasis? indinivir
    - HIV drug with AE of pancreatitis? stavudine/didanosine
    - HIV drug with AE of HSR? abacavir
        - Check HLAB57 before starting abacavir

- Opportunistic infections in AIDS
    - Watery diarrhea → *Cryptosporidium parvum*
        - Diagnostic? Acid-fast oocytes
        - Tx? Nitazoxamide

    - Meningitis → *Cryptococcus*
        - Tx? Amphotericin + flucytosine
        - Maintenance? Fluconazole

    - Difficulty swallowing → Esophageal *Candidiasis*
        - Tx? itraconazole
        - DDx? CMV esophagitis and HSV esophagitis
            - CMG esophagitis = linear ulcers on EGD
            - HSV esophagitis = shallow round ulcers on EGD

    - Skin lesions → Kaposi's sarcoma (HHV-8)

    - Ring-enhancing lesions on brain MRI (single vs multiple)
        - Single ring-enhancing lesion → primary CNS lymphoma
            - Virus? EBV
        - Multiple ring-enhancing lesions → *Toxoplasmosis*
            - Tx? Pyrimethamine-sulfadiazine

    - White **non**-scrapable oral lesions → oral hairy leukoplakia
        - Virus? EBV

- HIV PPx
    - CD4 < 250 + lives in Texas → itraconazole for Cocci
    - CD4 < 200 → TMP-SMX for *PCP*
    - CD4 <150 and lives in ohio → Itraconazole for *Histoplasmosis*
    - CD4 < 100 → TMP-SMX for *Toxoplasmosis*
    - CD4 < 50 → No PPx for MAC!
        - **Note**: azithromycin is no longer given as a PPx for MAC (i.e. no PPx given for MAC)

- CML
    - Translocation? t(9;22)
    - Dx? FISH

  - CBC findings? Basophilia
  - Presentation? **45 yo M with fatigue + weight loss + splenomegaly**
    - Think of "ML" in CML for "mid-life" -- presents in middle-aged pts :)
  - Tx? Imatinib (tyrosine kinase inhibitor)
  - Differentiating b/w CML vs leukemoid reaction
    - LAP high → leukemoid rxn
    - LAP low → CML

- Tx for neutropenic fever? Pip-Tazo or cefepime or carbapenem
  - Why? Need to cover *Pseudomonas*

- Tx for cancer-related cachexia? Megestrol acetate (progesterone analog)

- What 3 diseases result in high-output heart failure?
  - Bone → Paget's disease of bone
  - Hematologic → Anemia
  - Vascular → AVM

- DDx for eosinophilia? "NAACP"
  - N = neoplasms
  - A = allergies/asthma
  - A = Addison's disease
  - C = collagen vascular disease (e.g. SLE, scleroderma)
  - P = parasites

- HIV+ patient has acute-onset **shortness of breath** + **productive cough** + high fevers. CD4 count is 150. CXR shows **lobar consolidation**. → *Strep pneumo*
  - **Note**: In contrast, PCP pneumonia = interstitial infiltrates

- HIV complications and associated microbe
  - Retinitis → *CMV*

  - Esophagitis → *Candida*, CMV, or HSV
  - Meningitis → *Cryptococcus*
  - Diarrhea → *Cryptosporidium*
  - Bacillary angiomatosis → *Bartonella henselae*
    - Tx? doxycycline
  - Ataxia + motor deficits + diffuse hyperintense lesions → PML 2/2 JC virus
    - MS drug a/w PML? Natalizumab

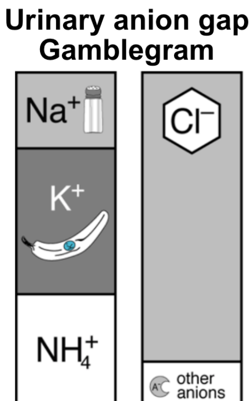
- Etiologies of AG metabolic acidosis aka high anion-gap metabolic acidosis? "MUDPILES"
  - Methanol
  - Uremia
  - DKA
  - Propylene glycol/Paraldehyde
  - Iron/INH
  - Lactic acidosis (rhabdomyolysis)
  - Ethanol
  - Salicylic acid (aspirin)

- Etiologies of **non**-anion-gap metabolic acidosis?
  - RTAs
  - Diarrhea

SERUM ANION GAP, URINE ANION GAP, AND WINTERS FORMULA

- **Serum AG** = [Na^+] – (Cl^- + $HCO3^-$)
  - Serum AG is calculated **to DDx anion-gap metabolic acidosis vs NAGMA**

- Urine AG = (Na^+ + K^+) – [Cl^-]
  - **Urine anion gap is calculated to DDx if NAGMA is d/t RTA vs diarrhea**
  - Negative Urine AG → diarrhea ("Ne**GUT**ive")


Urinary anion gap Gamblegram

        - Why? Large amt of unmeasured NH4+ is present in urine → this results in negative “#”
    - Positive Urine AG → Type I or Type IV RTA
        - NBS? Check Serum K+

    - Use **Serum** K+ to DDx Type I vs Type II vs Type IV RTA
        - **High Serum K+** → **Type IV RTA** (2/2 hypoaldosteronism)
        - Low Serum K+ → check urine pH
            - Urine pH > 5.5 → Type I RTA (unable to secrete acid/H+)
            - Urine pH < 5.5 → Type II RTA (unable to reabsorb bicarb → HCO3-/Na+ cotransporter at PCT does not run [cannot take up Na+] → excess loss of Na+ and water to lumen → activation of RAAS → Na+ and water reabsorbed more distally and K+ secreted. Also, HCO3- in lumen combines with K+)

SUMMARY FOR NAGMA VIGNETTES:

- **Step #1**: You have determined pt has NAGMA
- **Step #2**: Check Urine AG
    - Negative urine AG = diarrhea – you’re done!
    - Positive urine AG = RTA
- **Step #3**: If urine AG is positive, check K+
    - ↑ K+ = Type IV RTA – you’re done!
    - ↓ K+ = Type I or Type II RTA
- **Step #4**: If serum K+ is low, check urine pH
    - Urine pH < 5.5 = Type II RTA
    - Urine pH > 5.5 = Type I RTA

    - **When to use the Winter Formula? In metabolic acidosis to check if there is appropriate respiratory compensation**
        - Winter’s Formula? [Expected pCO2] = (1.5 x bicarb) + 8 ± 2
        - Example: bicarb = 16 and pCO2 = 20
            - [Expected pCO2] = (1.5 x 16) + 8 ± 2 = **30-34**

        - Conclusion? This pt has metabolic acidosis + respiratory alkalosis
    - **Note**: If pCO2 is ↑ than expected, there is a concurrent respiratory acidosis
    - **Note**: If pCO2 is ↓ than expected, there is a concurrent respiratory alkalosis

- Etiologies of metabolic alkalosis?
    - Drugs
        - Diuretics
    - Disease
        - Barter's/Gitelman's
        - Conn syndrome
    - Volume depletion

- Pt with **hematuria** + smoker OR Egyptian with *chronic* schistosomiasis OR history of nephrotic syndrome treated with cyclophosphamide. Dx? bladder cancer
    - Dx? cystoscopy
    - HY causes of hemorrhagic cystitis.
        - Cyclophosphamide
        - Adenovirus
        - *Schistosoma haematobium*

- How to prevent hemorrhagic cystitis 2/2 cyclophosphomide? Mesna!

- Type of bladder cancer caused by schistosomiasis? Squamous cell carcinoma of the bladder

- Indications for dialysis? "AEIOU"
    - A = **A**cidosis
    - E = **E**lectrolyte imbalance
    - I = **I**ngestion
    - O = fluid **O**verload

  - U = **U**remia

- Complications of uremia? Uremic pericarditis and platelet dysfunction
  - Tx for platelet dysfunction? Desmopressin

- Pt in his first-ever dialysis session then develops **CP + back pain**. Dx? First-use syndrome
  - Anaphylactic reaction to dialysis membrane or to materials used to sterilize dialysis machines

- Amyloidosis in patients on chronic dialysis. What protein involved? → β2 microglobulin

- Pt has abdominal pain + distension + **fever** + does **peritoneal** dialysis. → Spontaneous bacterial peritonitis (SBP)

- Pt has flank pain + CVA tenderness + high fevers + urgency/frequency/dysuria. Pyelonephritis
  - Dx? UA w/ culture
  - Urine Casts? WBC casts
  - Tx? Ceftriaxone or cipro
  - DDx outpatient treatment vs IV antibiotics
    - Admit pt's who are vomiting or can't tolerate PO
  - MCC pyelonephritis? *E. coli*

- FSGS – nephrotic syndrome
  - Classic demographic?
    - African Americans
    - HIV+
    - Heroin use
    - Obesity patients
  - Variant of FSGS seen in HIV? Collapsing variant FSGS
  - EM findings? Effacement of foot processes
  - Tx? Steroids + ACE-I +/- cyclophosphamide

        - Note: Per Pathoma 2017: FSGS has poor response to steroids

Nephritic Syndromes

Note: This section includes all info. from the lecture, and add'l info. has been added to enhance learning

- What is Rapidly Progressive Glomerulonephritis? Group of nephritic syndromes that rapidly progress to renal failure in **weeks to months**!

- List the RPGNs based on IF findings
    - Linear IF = Goodpasture Syndrome
    - Granular IF (wire-loop appearance) = PSGN; Lupus nephritis (DPGN)
    - Negative IF (pauci-immune) = GPA; MPA; Churg-Strauss
        - **Note**: GPA, MPA, and Churg-Strauss are also considered vasculitides

- Goodpasture syndrome
    - Classic presentation? **Young adult male** + hemoptysis + hematuria
    - IF findings? Linear pattern
    - Ab? anti-GBM

- **P**ost-*Streptococcal* glomerulonephritis
    - Classic presentation? **Cola-colored urine** with onset 2-6 **weeks** after *Strep* infection
    - IF findings? Granular pattern (2/2 immune-complex deposition)
    - EM findings? Sube**P**ithelial humps

- Lupus Nephritis aka Diffuse Proliferative Glomerulonephritis (DPGN)
    - IF findings? Pauci-immune
    - EM findings? Wire-loops (granular) ← "**LOOP**us = wire **LOOP**s"
    - MC renal disease in SLE

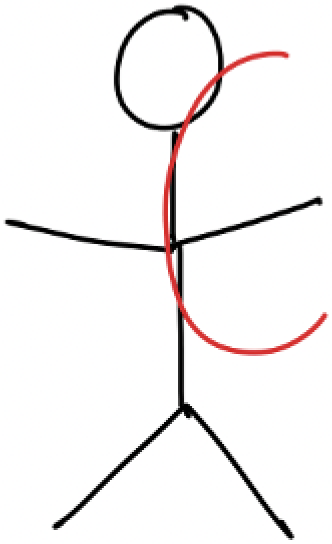
- IgA Nephropathy aka Berger Disease
    - Classic presentation? Hematuria 2-6 **days** *after* **URI** and a/w recurrent hematuria

- Alport Syndrome (**note**: included for completeness)
    - Presentation? Hematuria + hearing loss + ocular disturbances
    - Mechanism? Inherited Type IV collagen defect

VASCULITIDES

- Henoch-Schönlein Purpura
    - Classic presentation? **Child** + **joint pain** + **abdominal pain** + **non-blanching palpable purpura on butt** and LE's + **hematuria** after an upper respiratory infection
    - Associated with what nephritic syndrome? IgA nephropathy
        - Hematuria in HSP is 2/2 IgA nephropathy

- Granulomatosis with Polyangiitis aka Wegeners disease
    - Classic presentation? **Sinusitis** + hemoptysis + hematuria + **c-ANCA**
        - Alternative nose sxs? nasopharyngeal ulcers
    - IF findings? Pauci-immune
    - Marker? c-ANCA



“c-Disease”

- Eosinophilic Granulomatosis with Polyangiitis (EGPA) aka Churg-Strauss disease
    - Classic Presentation? **Asthma** + **eosinophilia** + granulomas (lungs) + **p-ANCA**
    - Marker? p-ANCA

- Microscopic polyangiitis
    - Classic presentation? Hemoptysis + hematuria + p-ANCA
    - Marker? p-ANCA

- How to DDx EGPA vs MPA since both have p-ANCA?
    - EGPA has **asthma** + **eosinophilia** + lungs
        - MPA does not!

- Pt has JVD + hypotension + muffled heart sounds. Dx? Cardiac tamponade
    - Tx? pericardiocentesis

ATRIOVENTRICULAR RE-ENTRANT TACHYCARDIA (AVRT)

- **Orthodromic AVRT** – "**ORTHO**pods drive Down **NARROW AV**enues"
    - Conduction pathway? Down AV node then *back up* via accessory pathway
    - QRS finding? **Narrow QRS**
    - Acute Tx?
        - Orthodromic AVRT + HDUS → Synchronized cardioversion
        - Orthodromic AVRT + HDS → Adenosine
    - Chronic Tx? Beta-blocker or ND-CCB
        - b/c want to slow down conduction through AV node → this slows the HR
    - Acute tx if HDUS? Synchronized cardioversion
    - Acute tx if stable? Adenosine

- **Antidromic AVRT** – "**ANTI**-people do everything opposite; that's why they drive **Down WIDE ACCESS** Roads"
    - Conduction pathway? **Down accessory** pathway then *back up* to AV node
    - QRS finding? **Wide QRS**
    - Classic cause? WPW
        - EKG finding? Delta waves!
    - Tx? Procainamide
    - Contraindicated drugs? Beta-blocker or ND-CCB
- EKG for TdP? Prolonged QT then sine waves
    - In contrast, EKG for VFib has sine waves without any preceding prolonged QT

- Prolonged QT interval
    - Drugs a/w prolonged QT?
        - Ondansetron
        - Haloperidol
        - Ziprasidone

        - Quinidine/disopyramide/procainamide
        - Amiodarone/Sotalol
        - FQ
        - Macrolides
    - Electrolytes abnormalities a/w prolonged QT?
        - Hypokalemia
        - Hypocalcemia
        - Hypomagnesemia
    - QT prolongation increases risk of what arrythmia? Torsade de Pointes
        - Tx TdP? IV Mag

- Physiologic or pharmacologic manipulation of cardiovascular parameters
    - Milrinone ("inodilator")
        - CO? ↑CO
        - SBP? ↑ SBP
            - **Why is SBP increased?** b/c CO and SBP move in tandem!
                - e.g. If CO increases, then SBP increases; vice versa
        - SVR? ↓SVR
            - **Why is DBP decreased?** b/c SVR and DBP move in tandem!
                - e.g. If SVR decreases, then DBP decreases; vice versa
        - DBP? ↓DBP
        - Pulse pressure? Widens
    - NE
    - Hydralazine
    - Nitrate

- Knife wound to arm + PEx reveals warm pulsating arm mass + LV EF of 75%. → high output HF 2/2 AV fistula

- **Japanese female** with abdominal pain and **> 10 mmHg difference in SBPs between arms** + 6 months of low-grade fevers + **elevated ESR** and **CRP** → Takayasu arteritis

    - Alternate presentation in arms? “weak or absent pulse in UE”

- **Pericardial knock** + JVP increase with inspiration + reduced EDV on echo. Dx? constrictive pericarditis
    - Note: JVP increase with inspiration aka “+Kussmaul sign”

- JVP Waveform to DDx cardiac tamponade vs constrictive pericarditis
    - Blunted (less steep) Y-descent on JVP waveform = cardiac tamponade
    - Steep Y-descent on JVP waveform = constrictive pericarditis

- **Note**: What is a normal JVP height (i.e. height above sternal angle)? < 4 cm!

RA/CVP Waveform Interpretation

'a' wave (end diastole)

right atrial (RA) contraction

Lost in atrial fibrillation/flutter

↑ 'a' wave in tricuspid/pulmonic stenosis and pHTN due to ↑ resistance to forward flow

"Cannon" 'a' waves in junctional rhythm, V-tach, 3° block from RA contraction against closed tricuspid valve (TV) generating large reflection wave back into RA

'c' wave (early systole)

TV cusps bulging into RA

Tricuspid regurgitation (TR) causes fusion of 'c' and 'v' waves with blunting of 'x' descent

'v' wave (late systole)

rapid filling of RA

↑ 'v' wave in TR (reaches RVSP) from regurgitant jet ↑ RA pressure

'x' descent (mid systole)

RA relaxation

↑ 'x' descent in constrictive pericarditis

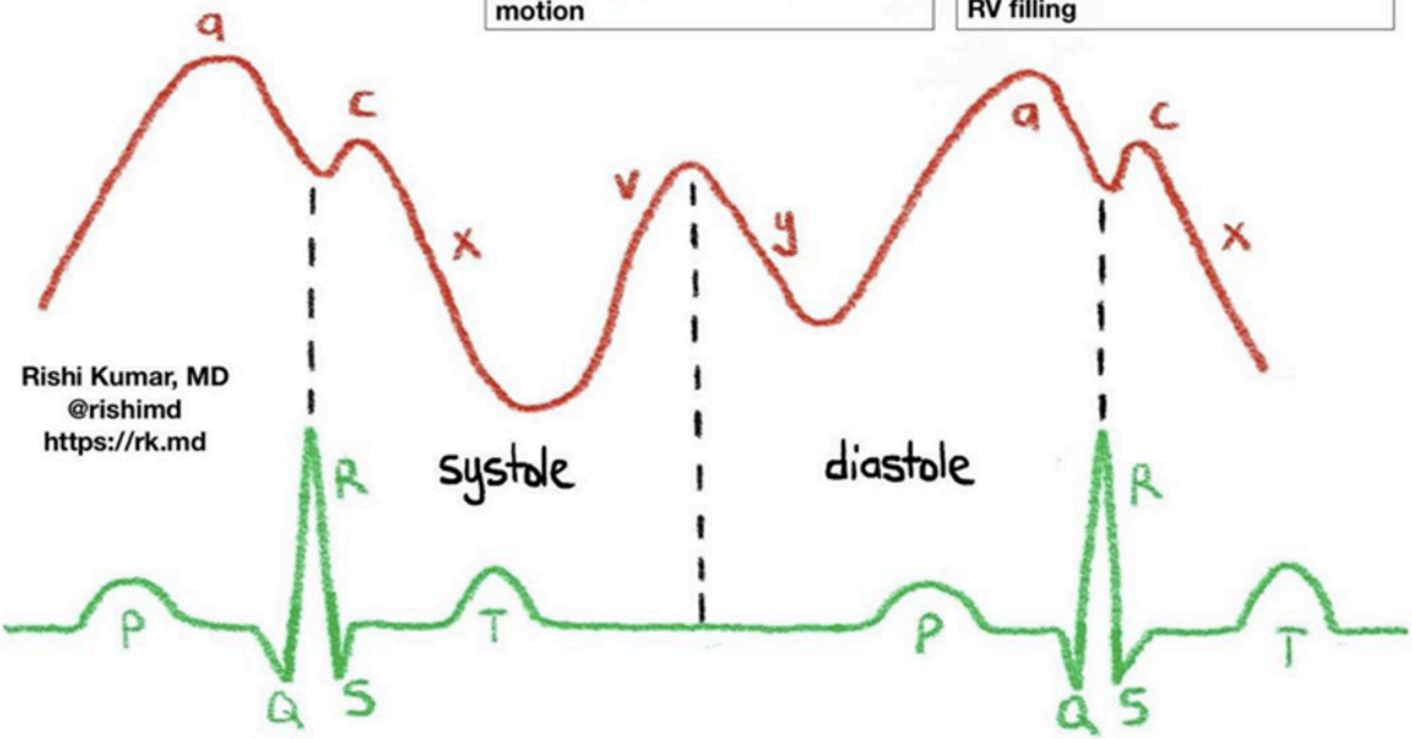
↓ 'x' descent with TR as this jet ↑ RA pressure. Suggests RV dysfunction due to ↓ apical motion

'y' descent (early diastole)

early ventricular filling

↑ 'y' descent in constrictive pericarditis

↓ 'y' descent in tamponade due to pericardial fluid pressure impairing caval inflow to RA and RV filling



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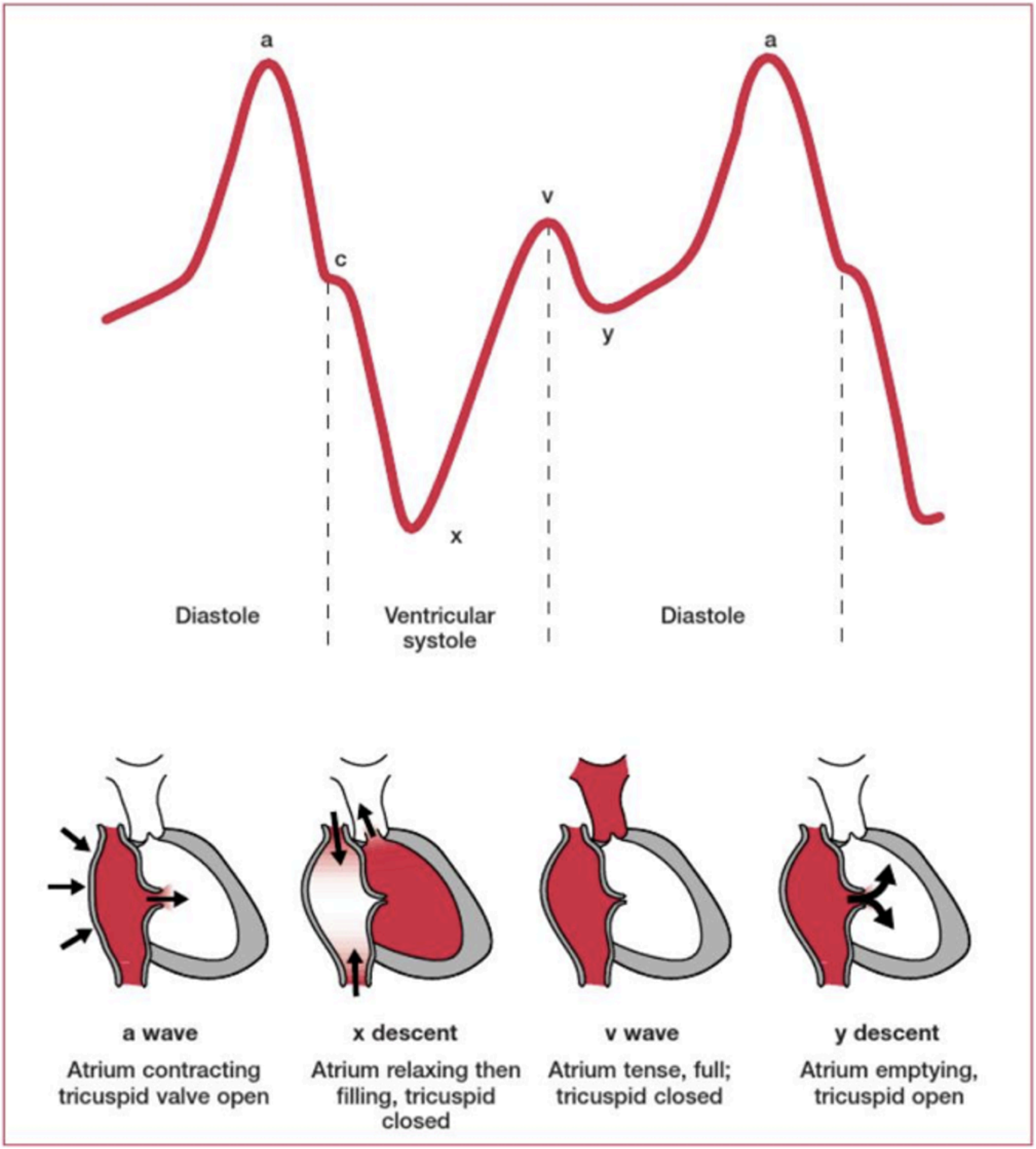

a
a
v
c
y
x
Diastole
Ventricular systole
Diastole
a wave
Atrium contracting tricuspid valve open
x descent
Atrium relaxing then filling, tricuspid closed
v wave
Atrium tense, full; tricuspid closed
y descent
Atrium emptying, tricuspid open

Figure 1. Waveforms of the jugular venous pressure (including a brief explanation for each wave). The "c" wave represents right ventricular contraction "pushing" the tricuspid valve back into the right atrium. Reproduced with permission from Oxford University Press (Longmore JM et al. *The Oxford Handbook of Clinical Medicine*, 5th Edn, p. 79).

- MCC of death in the first 24h after acute MI? V-Fib

- Pathophys of post-MI ventricular free wall rupture is similar to which heart path? Cardiac tamponade!
    - Mechanism? Blood spills out of heart via ventricular free wall rupture → free blood now surrounds and compresses the heart
    - Same sxs as cardiac tamponade! (JVD + hypotension + muffled heart sounds)

- Murmur in post-MI interventricular septal rupture? Harsh holosystolic murmur

- Murmur in post-MI papillary muscle rupture? Mitral regurgitation

- Tx for peri-infarction pericarditis? Aspirin

- Pericarditis weeks after MI. Dx? Dressler's syndrome
    - Pathophys? Autoimmune

- Tx for post-MI? Aspirin + statin + ACE-I + beta-blocker

- Colon cancer screening guidelines
    - Start at? 50 yo
    - Screening options?
        - Colonoscopy q 10 years
        - Flex sigmoidoscopy q 5 years
        - FOBT q 1 year
            - NBSIM if FOBT test is positive? Colonoscopy
    - Age to screen pts who have 1st-degree relative diagnoses with colon cancer?
        - At 40 yo or 10 years before age of relative at time of dx -- **whichever is earlier**!
            - e.g. 1st-degree relative diagnosed at 52 yo → screen at 40 yo (*not* 42 yo!)
            - e.g. 1st- degree relative diagnosed at 48 yo → screen at 38 yo

  - When to screen for colon cancer following ulcerative colitis dx? 8 years after UC diagnosis

- 22y M with multiple colon polyps. Dx? Familial Adenomatous Polyposis
  - Mutation? *APC* gene

- Multiple colon polyps + brain tumor. Dx? Turcot syndrome

- Multiple colon polyps + bone tumors + soft-tissue tumors. Dx? Gardner syndrome

- Early colon cancer arising from **normal** mucosa. Dx? HNPCC/Lynch syndrome
  - Mutation? MSH/MLH

- Hyperpigmented macules on lips + GI tract hamartomas. Dx? Peutz Jeghers Syndrome.

- Tx for GERD? PPIs
  - AEs of GERD?
    - Aspiration pneumonia
    - Osteoporosis
    - B12 deficiency
  - AE of cimetidine (PPI)? Gynecomastia (men)

- Tx for H. pylori
  - Triple therapy → PPI + amoxicillin + clarithromycin
  - Quad therapy → metro + bismuth + tetracycline + PPI (MBTP)

- 35 yo F with **15-year history of OCP use** presents with RUQ pain. U/S reveals **well-circumscribed hepatic mass**. → hepatic adenoma

- 60 yo M has 7 weeks of bilateral knee pain + chronic diarrhea. Bx of **intestinal mucosa is PAS+** macrophages + villous atrophy. PEx is notable for new murmur → Whipple's disease
  - Microbe? *Tropheryma whipplei*

  - Tx? Ceftrixone (or penicillin G) for 2 weeks then TMP-SMX for 1 year

- PAS**+** stain in liver. Dx?→ alpha-1 antitrypsin deficiency

- PAS**+** stain in GI tract. Dx? → Whipple's disease

- 60 yo M has **halitosis** + difficulty swallowing + **palpable neck mass** on swallow → Zenker diverticulum
  - Dx? Barium swallow
    - Do NOT do upper endoscopy (b/c it can perforate esophagus)

- Difficulty swallowing + **chest pain radiating to jaw** + **relieved with nitrates** → diffuse esophageal spasm
  - Dx? Manometry
  - Tx? CCBs or nitrates or TCAs

- 47 yo F with **diabetes mellitus refractory to treatment** + 1 week of **necrotic, erythematous skin lesion**. Dx? Glucagonoma
  - Associated syndrome? MEN1
    - b/c glucagonoma is a pancreatic endocrine tumor
  - Tx? Surgery or octreotide

- Tx for diabetic gastroparesis? Metoclopramide or Erythromycin (motilin receptor agonist)
  - AE? Extrapyramidal symptoms (e.g. tardive dyskinesia)
  - Pathophys? Damage to enteric nervous system

- 60 yo pt with **sepsis** + severe **abdominal** pain and **distension**. **Abdominal CT shows dilated colon with absence of obstruction**. Dx? → Ogilvie syndrome aka acute colonic **pseudo-obstruction**
  - Tx? Neostigmine
    - AE? bradycardia

- Pt with **elevated SCr** + **oliguria** + **history of ESLD**. Dx? Hepatorenal syndrome

  - Pathophys? Cirrhosis causes splanchnic vasodilation → this steals blood away from kidneys → kidneys become hypo-perfused
    - Cirrhosis leads to production of nitric oxide → nitric oxide causes venodilation of splanchnic vessels → ↓SVR → hypoperfusion of kidneys
  - Urine labs are similar to what type of AKI? Similar to prerenal AKI!
    - FeNa < 1%
    - BUN/Cr > 20
  - Tx? Liver transplant

- DDx hepatorenal syndrome vs prerenal azotemia based on fluid resuscitation?
  - No improvement with fluids → hepatorenal syndrome
  - Improvement with fluids → prerenal azotemia

- Pt with **hypoxia on standing or walking** + **SpO2 improves on lying down** + ESLD (end-stage liver disease). Dx? Platypnea-Orthodeoxia syndrome
  - Pathognomonic for what? Hepatopulmonary syndrome

- Diarrhea associations
  - Cruise ship gastroenteritis → norovirus
  - AIDS patient → *Cryptosporidium* parvum
  - 2 hrs after eating potato salad → *Staph aureus*
  - Daycare → rotavirus
  - Eating oysters → *Vibrio parahaemolyticus*
  - Eating fried rice → *Bacillus cereus*
  - Eating pork → *Yersinia enterocolitica*
  - Bloody diarrhea after eating poultry or eggs → *Salmonella*
  - Common cause of bloody diarrhea in the U.S. → *Campylobacter*

- MEN1 syndrome + jejunal ulcers + GERD refractory to tx. Dx? Zollinger-Ellison syndrome
  - Dx? Gastrin level
    - NBSIM if secretin is high but not “crazy high”? Secretin stimulation test

        - Increase in gastrin w/ secretin stimulation test = Z-E syndrome
  - Tx?
    - Medical? PPIs
    - Surgical? resection

- Ab’s in Type 1 and Type 2 Autoimmune Hepatitis?
  - Type 1 Autoimmune Hepatitis = anti-SM Ab’s (“anti-smooth muscle”)
  - Type 2 Autoimmune Hepatitis = anti-LKM Ab’s (“anti-liver kidney microsomal”)

- UC vs Crohn’s
  - UC
    - Bloody diarrhea + continuous lesions
    - a/w PSC (men)
  - Crohn’s
    - Skip lesions + non-caseating granulomas
    - Oxalate kidney stones
    - Pyoderma gangrenosum
    - Uveitis

- Joint disease associated with hemochromatosis? CPPD aka pseudogout
  - CCPD = calcium pyrophosphate deposition disease
  - Dx? Rhomboid-shaped with apple-green birefringence on Congo stain

- Dx for pancreatic cancer? CT scan

- Budd-Chiari syndrome = thrombosis of hepatic vein
  - Classic populations?
    - OCP users
    - Polycythemia vera
    - PNH

- Tx for APAP overdose? N-acetylcysteine
    - Mechanism of APAP toxicity? Elevated NAPQI levels

Cross Checked? Yes

Ep. 36: Ophthalmology

1. Central scotomas, straight lines look wavy = **age related macular degeneration**
    - 2 types - wet (exudative/neovascular) and dry (atrophic)
    - Wet: more progressive, but also more treatment options offered
        - Tx: VEGF inhibitors (Ranibizumab, Bevacizumab) or laser
    - Dry: drusen on fundoscopy; more common than wet
        - Tx: Vitamins C, E, beta-carotene, zinc slow progression
        - Note: (careful in smoking pt as increased mortality rate from lung cancer with Vit E and beta carotene)
    - MCC of vision loss in developing world = macular degeneration
    - Other risk factors = smoking, aspirin (chronic use)
    - Buzz word = neovascularization
    - Lose central vision (macula) (whereas in glaucoma lose peripheral vision)

2. Punched in eye + floaters and bright streaks of light = **retinal detachment**
    - Risk factors = trauma, cataract surgery
        - Note: others metabolic disorders, myopia, degenerative diseases, vascular disorders
    - Treatment strategies = *laser photocoagulation (buzzword to remember)*
    - Ophtho emergency

3. Newborn with R eye white reflex = **retinoblastoma**
    - Associated with = Osteosarcoma
        - Sunburst (codman's triangle) on Xray

4. Amblyopia vs strabismus
    - Amblyopia = cortical blindness -> eye normal but brain doesn't recognize is
        - MCC = strabismus
        - Others: anything that obstructs light - cataracts, glaucoma
    - Strabismus = misalignment of eye
        - Treat if persists past 3 months with patching of unaffected eye - makes the brain work the affected eye to align itself; eyepatch or "paralytic" drops with atropine
        - Corneal light reflex is uncentered in affected eye (not symmetric)
        - Writers note: red reflex will be brighter in affected eye

5. Asian male with sudden onset severe eye pain + nausea and vomiting following nasal decongestant use = **acute angle closure glaucoma**

- Alpha one agonist - phenylephrine will cause mydriasis
- Treatment = laser iridotomy (ophtho emergency), clonidine, muscarinic agonist (pilocarpine), mannitol or acetazolamide, latanoprost, beta-blockers
- Risk factors = African American, diabetes, steroid use (can decrease outflow at anterior chambers)
    - Closed (aCute) think Asians, Open (chrOnic) think African Americans
- MCRF = increase in intraocular pressure *Keep in mind
- Dx: Tonometry
- Fundoscopic exam = increased optic cup:disc ratio
- Ciliary epithelium makes aqueous humor made by ciliary epithelium (driven by sympathetic NS via beta2 receptors) → post chamber of eye → ant chamber ni→ drain via canal of Schlemm/ trabecular meshwork (M3 receptors) & some (~25%) through the uveoscleral outflow tract (controlled by prostaglandins)
- Treatment targets the different points in the pathway:
    - Aqueous humor production
        - **Beta blockers (Timolol)**: decrease aqueous humor synthesis (Beta2)
        - **Alpha2 agonist (briminodone)**- (Gi coupled inhibit adenylate cyclase) inhibit presynaptic release of NE
            - NOT in closed angle glaucoma - can precipitate closed (acute)
        - **Carbonic anhydrase inhibitor (acetazolamide)** - decrease the bicarb at the ciliary epithelium will decrease the Na+ and H20 transport and thus dec synthesis of aqueous humor
    - Uveoscleral outflow (note: his mechanism is a little off here so I'm adding the correct mechanism for PG agonists): increase outflow through the uveoscleral tract by increasing permeability with **prostaglandin agonists**
        - SE: Permanent discoloration of iris
    - Trabecular outflow - increased drainage of meshwork/canal with increase episcleral vasculature with **M3 agonists (Carbachol, Pilocarpine)**

6. 2 days of severe R eye pain + blurry vision + sinusitis taking Benadryl + pain with eye movement and 20/200 vision and difficulty moving EOM = **orbital cellulitis**

- Dx: clinical +/- ocular CT scan
    - Differentiate from preseptal cellulitis by involvement of EOM and pain with movement in orbital cellulitis - orbital cellulitis is preseptal cellulitis + other worsening symptoms
- Path: polymicrobial infection
- Tx: clindamycin + penicillin family
- Big risk factor = sinusitis

7. female with severe L eye pain, can barely see, worse after hot shower = **optic neuritis** due to multiple sclerosis

- Diagnostic imaging = MRI
- Tx = IV steroid (po steroid increases risk of recurrence of optic neuritis) *Very high yield info*
- Most likely sequelae = resolve over time

8. 76 yo F difficulty seeing while driving at night and reading road signs = **cataracts**

- Path = opacification of the lens
- Metabolic RF = diabetes (aldose reductase converts glucose to sorbitol, lens lacks sorbitol dehydrogenase to convert it to fructose so sorbitol accumulates in lens)
- Drug associated RF = steroids
- Infectious RF = congenital syphilis, congenital CMV, congenital toxo
- Newborn with a bilateral presentation = classic galactosemia (Galactose-1-phosphate uridyltransferase deficiency or GALT) - galactitol accumulates in lens and opacifies it
    - WNote: red reflex = dark, dull, white
    - Most common cause of death in newborns with galactosemia = e. coli sepsis**HY

9A.

- MCC conjunctivitis in **first 24 hours of life** = chemical conjunctivitis from silver nitrate (not used much anymore)
- - 5 day old newborn with "super" *purulent* conjunctivitis
    - Bug = **gonorrhea - within 1st week of life - most dangerous for blindness in US**
    - Tx = IV cefotaxime (3rd gen cephalosporin) Ceftriaxone causes kernicterus and cholestasis in newborns
    - Prophylaxis = topical macrolide (erythromycin)
        - § DOES NOT PPX AGAINST CHLAMYDIA
- - 12 day old newborn with "*watery*" discharge conjunctivitis and eyelid swelling
    - Bug = **chlamydia (serovars A-C) - appears 1-2 weeks after birth** - leading cause of preventable blindness worldwide
    - Tx = PO (oral!) erythromycin
        - Use an oral treatment to eliminate eye infection and possible nasopharyngeal infection otherwise will develop PNA at 1-3 months
        - Topical erythromycin does NOT ppx against chlamydia though remember
    - Prophylaxis relationship to presentation 2 = topical erythromycin does NOT ppx against chlamydia conjunctivitis
    - Pneumonia presentation = newborn with "staccato cough"
    - "down the line" nonbilious vomiting after tx (pear shaped mass) = pyloric stenosis from erythromycin

9B. Most likely Conjunctivitis

- Glued eyes in am (unilateral) + water discharge + rhinorrhea = viral
    - Tx = warm/cold compress
    - o HY bug = adenovirus "pharyngoconjunctivitis"
        - Remember adenovirus causes gastroenteritis and hemorrhagic cystitis
    - MCC conjunctivitis = viral
- Glued eyes in AM (unilateral then becomes bilateral) + purulent discharge + no rhinorrhea = bacterial
    - MCC bacterial conjunctivitis = s. aureus
    - Tx: antibiotic eye drop (erythromycin except contact-wearers use fluoroquinolone drops to cover for possible pseudomonas)
- - Hx of asthma + BL itchy red eye = allergic conjunctivitis

        - ○ Tx: antihistamine eye drops (Olopatadine, Azelastine)

10. Eye pain + worsened in light in 23yo male with hx of chronic LBP and morning stiffness = ankylosing spondylitis = **anterior uveitis**

    - Pulmonary disease association = sarcoid
    - Pediatric rheumatology association = oligoarticular JRA
        - If given JRA pt and asked next best step - **slit lamp**
    - If determine caused by HSV - give acyclovir +/- topical steroid vs. cause is autoimmune phenomenon give topical steroid

11. 70 yo F with difficulty reading books. Has to move books way from her eyes to make out the words = **presbyopia**

    - Path = lens loses elasticity with age so can't accommodate (just like skin loses elasticity)

12. Differentiate central retinal artery occlusion from central retinal venous occlusion - HY*

- **CRAO** = acute, painless, monocular vision loss
    - Amaurosis fugax – curtain over eye
        - Note: assoc with Temporal arteritis, carotid a stenosis; presents as transient loss of vision for several minutes and then eventually present with persistent vision loss (aka CRAO)
    - Dx: ocular u/s + fundoscopic exam = **thin** retinal vessels, fundal pallor (swelling of the retina)* helps distinguish from venous occlusion
    - Tx: ocular massage and high flow oxygen while en route to hospital; once at hospital give TPA
- **CRVO** = rapid, painless loss of vision of varied severity
    - Dx: fundoscopic exam = optic DISC swelling (vs retinal swelling in CRAO)thick retinal vessels, blood and thunder retina, cotton wool spots, hard exudates
        - Fluorescein angiography not u/s if suspect venous occlusion
    - Tx: VEGF-I, photocoagulation
- Don't forget about these both presenting with cherry red spot on fundoscopy:
    - Tay-sachs (hexosaminidase A deficiency) losing milestones and impaired startle, no HSM
    - Niemann-pick (sphingomyelinase deficiency) - similar to Tay Sachs but with hepatosplenomegaly
- Diabetic Retinopathy - presents very similar to CRVO **note similar descriptions
        - Nonproliferative: dot and blot hemorrhages, hard exudates, retinal edema, microaneurysm
        - Preproliferative: cotton wool spots
        - Proliferative: neovascularization (buzzword), macular edema
    - Do fundoscopic exam - repeat every year; to make definitive diagnosis do fluorescein angiography to confirm diagnosis (r/o CRVO)
    - Tx: same as CRVO - VEGF-Inhibitor, laser photocoagulation

13. 19 yo F with pain and a "foreign body sensation" in the eye + wears contact lenses = **corneal abrasion**

- Dx = fluorescein slit lamp exam - can't see with naked eye

- Tx = REMOVE contact, topical broad spec antibiotic coverage with pseudomonas coverage (fluoroquinolone) topical NSAID drop for eye, ~~eye patch~~ (he says you can but avoid patching it)

  Cross checked: Yes

Ep. 37: Risk Factors

#1 RF = number one risk factor
MCC = most common cause
MCCOD = most common cause of death

1. #1 RF for suicide is prior suicide attempt
2. #1 RF for AFib → Mitral stenosis.
3. Most common arrhythmia in hyperthyroidism → A fib.
4. #1 RF for Mitral stenosis → Rheumatic fever

5 #1 RF for AAA development→ smoking

6. Screen AAA → men + 65-75yo + smoker. If >5.5 cm → surgery. Or >0.5cm/6 mos or 1 cm/yr growth
7. Greatest predisposing risk factor to rupture of AAA → diameter of aneurysm
8. Most important modifiable RF for CAD → smoking
9. #1 RF for stroke and aortic dissection → HTN
10. Biggest RF in iron deficiency anemia pt with h/o H.Pylori→ PUD
11. #1 RF for esophageal adenoCa → barrett's esophagus which is caused by GERD
12. MCC CAP → Strep. Pneumo
13. MCC UTI→ E.coli
14. Common RF for osteoporosis → Low BMI.
15. Controlling blood glucose only decreases microvascular risks associated with retinopathy, neuro, and nephropathy, not macrovascular like CAD and stroke.
16. #1 RF for SCC → cumulative sun exposure
17. #1 RF for ovarian cancer → FHx of OCa.
18. #1 RF for prostate,breast Ca → Age
19. MCCOD in pt with kidney transplant → CV disease
20. MCCOD in acromegaly → heart failure

21. MCCOD (most common cause of death) in CKD ⟶ CVDisease./ arrhythmia followed by infection
22. #1 RF for OSA ⟶ obesity
23. #1 modifiable RF for knee OA ⟶ obesity
24. MCCOD in ADPKD ⟶ CVDisease (not SAH!).
25. MCCOD in SLE ⟶ ischemic heart disease
26. #1 RF for pancreatic Ca ⟶ smoking
27. MCC cancer a/w asbestos exposure ⟶ Bronchogenic carcinoma

27.5) Mesothelioma has no relation to smoking

28. Which pneumoconiosis increases risk of TB ⟶ Silicosis
29. MCC of acute pancreatitis in America ⟶ Gallstones https://bit.ly/3CmHLvc
30. MCC Chronic pancreatitis ⟶ alcoholism
31. #1 RF for papillary thyroid cancer ⟶ prior chest/neck radiation
32. Breast CA Screening ⟶ every year from 40 yo. USPSTF ⟶every 2 years start at 50 until age 75,
33. Cervical CA screen ⟶ every 3 years 21-30 regardless of sexual activity. >30 ⟶ HPV + pap every 5 years.
34. Hyperlipidemia screen ⟶
    - men: every 5 year >35yo men
    - women: every 5y > 45 yo
35. Colon CA Screening Guidelines ⟶ Colonoscopy is gold standard
    - Normally: Colonoscopy q 10 years from 50-75 yo.
    - UC pt's: staring 8 years after diagnosis then every 1-2 years after.
    - If FHx colon cancer: 10 year prior to family member's age at diagnosis.
    - FAP pt's: q 1 year starting at 10-15 yo
36. All pregnant women 1st prenatal visit ⟶ screen syphilis, asymptomatic bacteriuria, HIV
37. Rh immunoglobulin screen ⟶ 28-32 wks + within 72 hours of delivery. Determine dose ⟶ kleihauer-betke test
38. Melanoma most likely determination of spread⟶ breslow depth
39. #1 prevention of Hepato cellular carcinoma ⟶ Hep B vaccination
40. #1 RF for ED ⟶ CVD
41. MCCOD in cervical cancer ⟶ Renal failure esp ureters
42. Most important prognostic factor in cancer⟶ stage of tumor (TNM staging)

43. Lung CA → low dose CT, men and women, 55-80 who have >30pp smoking hx, who currently smoke + less than 15 yr since quitting.
44. #1 RF for endometritis → C-section
45. #1 RF for preeclampsia → prev hx of Preeclampsia/ nulliparity
46. #1 RF for uterine inversion → Prior inversion
47. #1 RF for chorioamnionitis → prolonged rupture of membranes
48. #1 RF for placenta previa → prior C-section
49. HY RF to preterm labor → bacterial vaginosis
50. #1 RF for endometrial cancer → unopposed estrogen> endometrial hyperplasia
51. #1 RF for ectopic pregnancy → hx of ectopic pregnancy and smoking (affects cilia)
52. #1 RF for Cervical incompetence → cervical conization procedure or LEEP
53. #1 RF for cervical cancer → HPV
54. #1 RF for fetal macrosomia → gestational diabetes or preexisting diabetes
55. #1 RF for shoulder dystocia → fetal macrosomia
56. MCC of placental abruption → trauma/cocaine
57. RF of urinary incontinence→ age and multiple vaginal deliveries (stress incontinence), Diabetes→ overflow incontinence, MS→ urge incontinence
58. RF for Asherman's syndrome→ history of uterine curettage
59. #1 RF for bladder cancer → smoking

Cross checked? Yes

Ep. 41: Antibiotics Guide

	Opening Pressure	Cell Type	Protein	Glucose
Bacterial Meningitis	↑	PMNs	↑	↓
Fungal/Tb Meningitis	↑	Lymphocytes	↑	↓

Viral Meningitis	**Normal** or ↑	Lymphocytes	**Normal** or ↑	Normal

- Neonate (newborn) with nuchal rigidity. → *GBS* meningitis
    - Microbe? Group B Strep *(Strep agalactiae)*
        - #1 cause bacterial meningitis in first 28 days of life
    - Tx? “CVA” for meningitis in first 28 days of life
        - **C**efotaxime + **V**ancomycin + **A**mpicillin
            - **C**efotaxime covers *GBS/Strep pneumo/Neisseria*
            - **V**ancomycin covers *MRSA*
            - **A**mpicillin covers *Listeria*
                - *Listeria* is ~100% fatal if untreated
        - **Note**: Do NOT use ceftriaxone in neonates b/c it causes biliary sludge
    - Alternate Tx? Ampicillin + gentamicin (not as common anymore)

- 65 yo M with nuchal rigidity + fever + headache. → Meningitis
    - Tx for meningitis in elderly pts (> 50yo)? “CVA”
        - **C**eftriaxone + **V**ancomycin + **A**mpicillin
        - Elderly pt’s need standard meningitis tx plus *Listeria* coverage

- 33 yo F with no relevant PMH has nuchal rigidity + headache + fever. → *Strep pneumo* Meningitis
    - Tx? Ceftriaxone + Vancomycin + Streoids (“CVS”)

- MCC meningitis in adults 18-65 yo? Strep pneumo

- **Hospital-acquired** or **post-neurosurgical procedure** bacterial meningitis.
    - Microbes a/w hospital-acquired infections? *Pseudomonas* and *MRSA*
    - Tx? Ceftazidime or cefepime + vancomycin
        - Ceftazidime = only 3rd gen ceph covering Pseudo)
        - Cefepime (4th gen ceph)

- Headache + nuchal rigidity + fever. LP shows **gram-positive diplococci** + neutrophil predominance. → *Strep. pneumo* meningitis
    - Histo? Gram+ diplococci aka gram+ cocci in pairs aka lancet-shaped Gram+ cocci in pairs
    - Tx? **C**eftriaxone + **V**ancomycin + IV **S**teroids (“CVS”)
        - IV steoids reduces morbidity & mortality of *Strep pneumo* meningitis
        - Give IV dexamethasone before giving abx

- **HIV** pt has severe headache + nuchal rigidity + **papilledema**. → *Cryptococcal* meningitis
    - Microbe? *Cryptococcus*
    - LP findings? ↑ WBC with lymphocyte predominance + ↓ glucose + ↑protein

    - LP opening pressure? ↑↑ significantly elevated opening pressure
        - Very high opening pressure = *Cryptococcus* (*b/c Cryptococcus* occludes CSF flow)
    - Dx?
        - **CSF antigen test (highly sensitive and specific)**
        - Latex agglutination assay or India ink stain
    - Tx? (Liposomal) Amphotericin B + flucytosine
        - **Note**: can also use Liposomal Amphotericin B b/c less likely to cause AE of nephrotoxicity)
        - MOA amphotericin B? binds ergosterol → makes holes in fungal membrane
        - MOA flucytosine? Inhibits thymidylate synthase
    - Maintenance Therapy? Fluconazole until symptoms resolve + CD4 >100 for >1yr

- Tx for bacterial meningitis in HIV+ patient? “CVA” -- **C**eftriaxone + **V**anc + **A**mpicillin
    - Same tx as elderly pt’s

- Opportunistic Infections in HIV

Coccidiomycosis	*P. jirovecii*	*Histoplasmosis*	*Toxoplasmosis gondii*	*MAC Complex*
· CD 4+ < 250 + lives in **AZ** · PPx = itraconazole	· CD4 < 200 · PPx = **TMP-SMX** **or** pentamidine (HY alternative) **or** dapsone (HY alternative) **or** atovaquone · Tx = TMP-SMX + dapsone	· CD 4+ < 150 + lives in **KY** · PPx = itraconazole · Tx = IV liposomal amphotericin B	· CD4 < 100 · PPx = TMP-SMX · **T**x = **S**ulfadiazine + **p**yrimethamine ○ “It’s **TOX**ic to **ST**eal and **P**yrate”	· CD4 < 50 · PPx = none · Tx = azithromycin + ethambutol

    - HIV + CD4 < 250 + lives in AZ → *Coccidioidomycosis*
        - PPx? Itraconazole
    - HIV + CD4 < 200 → *Pneumocystis jirovecii*
        - PPx? **TMP-SMX** or pentamidine (HY alternative) or dapsone (HY alternative) or atovaquone
            - MOA of TMP? inhibits dihydrofolate reductase
            - MOA of SMX? inhibits dihydrofolate synthetase
    - HIV + CD4 < 150 + lives in KY → *Histoplasmosis*
        - PPx? Itraconazole
    - HIV + CD4 < 100 → *Toxoplasmosis gondii*
        - PPx? TMP-SMX (which should be covered at CD4 < 200)
    - HIV + CD4 < 50 → Mycobacterium avium complex (MAC)
        - PPx? None
            - Per UW: PPx no longer given d/t low risk, abx resistance and cost
        - Tx? Azithromycin + ethambutol
            - Rifabutin is 2nd line

        - Maintenance therapy? Continue tx for >1yr and CD4 >100 for > 6mo

- Pt on chemotherapy develops fever + WBC count is 2000. → Neutropenic fever
    - Microbes? *Pseudomonas* + *MRSA*
    - Tx? **Ceftazidime** (or Cefepime) + Vancomycin

- HIV + seizures + MRI shows **multiple ring-enhancing lesions in brain**. → Toxoplasmosis
    - Tx? Sulfadiazine + pyrimethamine (+ steroids if pt has papilledema or AMS)
        - "It's **TOX**ic to **ST**eal and **P**yrate" = **T**x **Tox**o w/ **S**ulfadiazine + **P**yrimethamine
        - MOA sulfadiazine? DHF synthetase inhibitor
        - MOA pyrimethamine? DHF reductase inhibitor
    - NBSIM for pt with toxoplasmosis + ↑ICP (e.g. papilledema or AMS)? Add steroids!

- Tx for pt with **seizures due to neurocysticercosis**? Phenytoin (i.e. anti-epileptics)
    - Do NOT give anti-helminth drugs b/c they will cause a fatal inflammatory response

- HIV + headache + nuchal rigidity. LP is positive for CSF with **500 RBCs**. MRI reveals hyperintense lesions in the temporal lobe. → HSV encephalitis/meningitis
    - Tx? IV Acyclovir or foscarnet

- Pt has **sudden-onset** severe headache + nuchal rigidity + LP shows 4000-5000 RBCs. → Subarachnoid hemorrhage

- CSF findings of HSV encephalitis/meningitis vs subarachnoid hemorrhage
    - HSV encephalitis/meningitis = RBCs in hundreds but < 1000
    - Subarachnoid hemorrhage = RBCs in thousands (4000-5000)

- HIV + headache + nuchal rigidity. LP shows **lymphocytic pleocytosis**. Imaging shows **enhancement at base of brain** (or in basilar cisterns". → Tb Meningitis
    - Tx: "RIPE"
        - **R**ifampin – AE: red urine; MOA: RNA polymerase inhibitor
        - **I**soniazid – AE: drug-induced lupus; supplement B6 to prevent neuropathy
        - **P**yrazinamide
        - **E**thambutol – AE: ocular/color blindness

- Pt has tender lesion on left lower extremity. PEx reveals blanching erythematous lesion on calf. Vital are normal. → Cellulitis
    - MCC of cellulitis? *Staph aureus*
    - Tx? Clindamycin or TMP-SMX or Cephalexin

- DDx Cellulitis vs Erysipelas vs Folliculitis
    - Cellulitis = blanching borders + on lower extremities + normal vitals
    - Erysipelas = **well-circumscribed + elevated** + face + abnormal vitals
        - MCC of erysipelas? *Strep pyogenes*

    - Folliculitis = infection of hair follicles
        - MCC of folliculitis? *Staph aureus*
        - Recent hot-tub exposure = *Pseudomonas* folliculitis

- Empiric Tx for animal or human bites? Amox-Clav

- Empiric Tx for community-acquired PNA? “M or D (medical doctor)”
    - Macrolide (**Azithromycin)** or Doxycycline

- Empiric Tx of hospital-acquired PNA. “M or D-c (certified medical doctor)”
    - Macrolide (e.g. **Azithromycin)** or Doxycycline + Ceftriaxone

- Tx for HAP if pt is allergic to PCN? FQ monotherapy (e.g. moxifloxacin or levofloxacin)

- Microbe if pt has HAP + CXR shows cavitary infiltrate? MRSA!
    - Tx? Clindamycin or Vanc or Linezolid

LYME DISEASE – PT WILL BE FROM NORTHEAST!

- Tx for 7 yo M with bullseye rash? Amoxicillin
    - Always give amoxicillin in children < 8yo -- NO Doxycycline!

- Tx for 30 yo F with bullseye rash? Doxycycline

- Tx for 35 yo pregnant female with bullseye rash? Amoxicillin
    - Same tx as kids!

- Dx? ELISA then confirm with Western Blot (needed for early disseminated or late Lyme)
    - b/c Western blot sent without ELISA results in high false-positive rates

- Tx for pt with meningitis or chest pain or myocarditis + history of bullseye rash? IV ceftriaxone
    - IV ceftriaxone needed for advanced Lyme disease

- Pt from **North Carolina** has severe headache + T of 104. PEx shows **rash on palms and soles**. → Rocky Mountain Spotted Fever
    - Microbe? Rickettsia rickettsii (+ve Weil-Felix test)
    - Tx? **Doxycycline**
        - **Note**: Do not be tricked! Any pt (even < 8 yo) who has RMSF and is not pregnant should

    - be treated with doxycycline (d/t high mortality rate if untreated)
  - Tx in pregnant female? Chloramphenicol – essentially the only time it will be the right answer
    - AE? Gray-baby syndrome

- 23 yo non-pregnant woman has suprapubic pain + urinary frequency + urgency + burning on urination. → Cystitis (UTI)
  - MCC of UTIs? *E. coli*
  - Tx? **Nitrofurantoin** or ciprofloxacin or TMP-SMX or Fosfomycin

- Tx for UTI in pregnant woman? **Nitrofurantoin** or Fosfomycin
  - Do not give cipro or TMP-SMX d/t teratogenic effects

- Pt has CVA tenderness + dysuria. → Pyelonephritis
  - Tx? **Ceftriaxone** or fluoroquinolone 2nd best (**note**: do not give FQ to pregnant patient!)

- 31 yo F develops fever + uterine tenderness 2 days after having C-section. → Endometritis
  - Tx? **C**lindamycin + **G**entamicin
    - "**ECG**" = **E**ndometritis tx with **C**lindamycin + **G**entamicin

- 33 yo F in active labor + T is 102 + fetal HR is 190 bpm. → Chorioamnionitis
  - Chorioamnionitis = Maternal fever + fetal tachycardia
  - Tx? **A**mpicillin (cover Listeria) + **G**entamicin
    - "CAG" = **C**horioamnionitis tx with **A**mpicillin + **G**entamicin

- Tx for Latent TB?
  - **Isoniazid for 9 months + B6**; or
  - Rifampin for 4 months

- Tx for Active TB? RIPE + B6

- 21 yo sexually active F + vaginal discharge OR cervical motion + adnexal tenderness + inconsistent condom use. → Pelvic Inflammatory Disease (PID)
  - Microbes? Chlamydia + Gonorrhea
  - Tx? **Azithromycin (or Doxy) + Ceftriaxone**
    - AZT or Doxy for Chlamydia
    - Ceftriaxone for Neisseria
  - Tx if *only* Chlamydia is detected? Azithromycin or Doxy
  - Tx if *only* Gonorrhea is detected? **Azithromycin (or Doxy) + Ceftriaxone**
    - Even if only Gonorrhea is detected, need to cover for both Chlamydia and Gonorrhea

- 21 yo F has RUQ pain + history of PID → Perihepatitis aka Fitz-Hugh-Curtis syndrome

- Female has **off-white/gray** vaginal discharge with **fishy odor** → *Gardnerella* vaginosis
    - Labs?
        - pH > 4.5 (grows in vaginal pH > 4.5)
        - **Clue cells**
    - Tx? Metronidazole or clindamycin

- Female has frothy **yellow-green** that is malodorous → *Trichomonas* vaginosis
    - Labs?
        - pH > 4.5
        - Motile trichomonads
    - Tx? Metronidazole for patient **+ partner**

- Female has thick **cottage-cheese** vaginal discharge → *Candida* vaginosis
    - Labs?
        - pH < 4.5
        - Pseudohyphae (grows as germ tubes at 37ºC)
    - Tx? **"—azoles"** (fluconazole)

- Tx for systemic *Candidemia* (blood infection)? **Echinocandins ("—fungin")** or Ampho B
    - e.g. Caspo**fungin** or myco**fungin** or andula**fungin**

- Tx for oral candidiasis? Nystatin swish-and-swallow

- Pt **on CTx** (i.e. **ICH**) + neutropenia + **eosinophilia** + **cough** + **hemoptysis** → *Aspergillus*

- Pt **on CTx** (i.e. **ICH**) + **non-resolving PNA** despite standard PNA treatment → *Aspergillus*
    - Histo? Acute angles of 45º
    - Tx? Voriconazole

- Pt with uncontrolled DM + glucose in hundreds + facial pain → *Mucor* or *Rhizopus*
    - Histo? Budding at 90º angles
    - Tx? Surgical debridement + liposomal Amp B

- Tx of allergic bronchopulmonary *Aspergillosis*? oral steroids (+ itraconazole if chronic/recurrent)

- **Fungal Infection**s
    - Tx for Coccidioidomycosis? Itraconazole
    - Tx for Histoplasmosis? Itraconazole
    - Tx for Blastomycosis? Itraconazole
    - Tx of sporotrichosis (*Sporothrix schenkii*)? Itraconazole
        - Class presentation? **Rose** gardener with **lymphadenopathy** along **lymph node chain**
    - Tx for tinea

        - Tinea corporis = topical antifungal ("—azole")
        - Tinea capitis and tinea unguium = terbinafine or griseofulvin (oral anti-fungals)
        - Microbes a/w tinea? Trichophyton, Microsporum, Epidermophyton
    - Tx for *all* invasive aka systemic fungal infections? Amphotericin B

- General treatment for all stages of syphilis? Penicillin G IM

- Tx for syphilis in pt's allergic to PCN? Macrolide (AZT) or doxycycline

- Tx for syphilis in pt with **PCN allergy** who is pregnant **or** has neurosyphilis? Desensitization then penicillin!

Primary Syphilis	PCN G IM x**1** dose	Doxycycline x14d
Secondary Syphilis (same tx as primary)	PCN G IM x**1** dose	Doxycycline x14d
Latent Syphilis (asx)	PCN G IM x**3** doses	Doxycycline x**28**d
Tertiary Syphilis	PCN G IM x**14** days	**Ceftriaxone** x14d

- Tx for GI infections (e.g. diverticulitis, appendicitis, cholecystitis)?
    - "MAG" = Metronidazole + Amoxicillin + Gentamicin
    - "MC" = Metronidazole + Cipro
        - "MAG-MC" ("Mad EmCee")

- Tx of gastroenteritis (e.g. *Salmonella* or *Shigella*)? **Fluoroquinolone** or macrolide

- Tx options for malaria.
    - Chloroquine – but tons of resistance so don't choose it
    - Mefloquine - most common PPx
    - Atovaquone + Proguanil
    - Artemether + lumefantrine
    - Primaquine = to kill hypnozoites, which cause latent malaria
        - NBSIM before prescribing primaquine? Test for G6PD deficiency
        - Microbes a/w hypnozoites? *Plasmodium vivax* and *Plasmodium ovale*

- MC PPx for malaria? Mefloquine

- High-yield AEs of HIV drugs.
    - AE of pancreatitis → Didanosine or Zidovudine – think about pancreatitis
    - AE of fat lipodystrophy → Ritonavir/Protease inhibitors

        - fat lipodystrophy = redistribution of fat from extremities to central trunk
    - Bactrim with hemolytic anemia – G6PD
    - AE of vivid dreams and teratogens → Efavirenz and Delavirdine
    - AE of fatal hypersensitivity reaction → Abacavir
        - NSBIM before starting abacavir? Check for HLA*B5701 mutation (d/t ↑ risk of fatal hypersensitivity)

- HIV pt develops bacillary angiomatosis due to *Bartonella henselae*. Tx? Macrolide or doxycycline
    - Macrolide = azithromycin, clarithromycin, erythromycin)
    - **Note**: Add rifampin for severe *Bartonella* infections

EMPIRIC TREATMENT

- Post-antibiotic diarrhea → *C. difficile*
    - Prevention? Hand washing
    - Tx? Metronidazole or vancomycin or fidaxomicin
        - **Note**: Vancomycin is now first-line for *C. diff* but USMLE may not be updated to reflect this

- Bloody diarrhea + liver abscess → *Entamoeba histolytica*
    - Note: only HY protozoa a/w bloody diarrhea
    - Tx? Metronidazole

- Watery diarrhea in AIDS pt → *Cryptosporidium parvum* (acid-fast positive)
    - Tx? nitazoxanide

- Diarrhea in "post-transplant" pt → CMV colitis
    - Tx? Ganciclovir

- Kidney infection in post-kidney transplant patient → BK virus (polyomavirus)

- Mnemonic for microbes treated with metronidazole? "GET GAP"
    - *Giardia* -- foul-smelling diarrhea after drinking from a stream
    - *Entamoeba* -- bloody diarrhea + liver abscess
    - *Trichomonas* -- malodorous yellow-green discharge + strawberry cervix
    - *Gardnerella* -- fishy-smelling gray discharge + clue cells
    - Anaerobes -- this is why metronidazole is used in GI infections!
    - Protozoa

- HIV + bilateral interstitial infiltrates on CXR → *Pneumocystis jirovecii* PNA
    - Tx? TMP-SMX or IV pentamidine

- HIV + bilateral interstitial infiltrates on CXR + **A-a gradient >35 or PaO2 <70 or SaO2 <92%** → *Pneumocystis jirovecii* PNA
    - Tx? TMP-SMX **+ steroids** (or IV pentamidine + steroids)
    - Indications to add steroids to tx for PCP pneumonia?
        - A-a gradient >35 or
        - PaO2 <70 or
        - SaO2 <92%
        - **Note**: pt will have hypoxia + respiratory alkalosis :)

- What 3 populations at risk for PCP pneumonia?
    - HIV pt's
    - Pt's on chronic steroids (i.e. non-HIV pts)
    - Pt's on immunosuppressants s/p solid organ transplant (e.g. kidney transplant)

- Influenza
    - Tx for sxs > 48h = supportive care
    - Tx for sxs < 48h = oseltamivir or zanamivir

- Post-partum woman + fever + **unilateral** breast tenderness → mastitis
    - Microbe? S. aureus
    - Tx? nafcillin or dicloxacillin

- Post-partum woman + fever + bilateral breast tenderness → breast engorgement
    - Tx? Continue breastfeeding

- General HIV regimen? 2 NRTIs + 1 other drug (i.e. integrase inhibitor or NNRTI or protease inhibitor)
    - Integrase inhibitor, e.g "—tegra—"
    - NNRTI, e.g. Delavirdine, Efavirenz, Nevirapine
    - Protease inhibitor, e.g. "—navir"

- Conjunctival injection after returning from Hawaii → Leptospirosis
    - Tx? doxycycline
        - Transmission? pee of animals in water

- RMSF – classically rash on palms and soles with thrombocytopenia
    - Thrombocytopenia – think
        - Anaplasmosis
        - Ehrlichiosis
        - Rickettsia rickettsii

- Tx for Legionella? macrolide (azithro/clarithro/erythromycin) or fluoroquinolones

- Tx for H. pylori?
  - Triple therapy -- “CAP” = Clarithromycin + Amoxicillin + PPI
  - Quadruple therapy – “MBTP” = Metronidazole + Bismuth + Tetracycline + PPI

- Anthrax
  - Buzzword? Spore-forming rods in chains produces exotoxin with protective antigen, edema factor, lethal factor, and polypeptide capsule (poly-D-glutamate), colonies form “medusa head” with halo of projections; humans inhale the spores
  - Cutaneous form: Black eschar most common
  - Pulmonary form: (woolsorter’s disease – spores on animals) widened mediastinum, pulmonary infiltrates (nonspecific)
  - Treatment: doxycycline or fluoroquinolone
  - Think of this bug if given a government worker as it can be a bioweapon

- MC microbe in osteomyelitis? MRSA

- Drugs to tx MRSA?
  - Vancomycin
  - Daptomycin
  - Ceftaroline (5th gen cephalosporin)
  - TMP-SMX
  - Clindamycin (note: a/w C.diff colitis)
  - Linezolid (50S inhibitor; note: weak MAOI, so can trigger serotonin syndrome)
  - Streptogramins, e.g. dalfopristin/quinupristin

- Drugs to tx Pseudomonas?
  - Ceftazidime (3rd gen)
  - Cefepime (4th gen)
  - Cipro
  - Aminoglycosides
    - **Note**: CF pts > 20 yo receive inhaled tobramycin to cover chronic *Pseudomonas* infection :)
  - Carbapenems
    - Note: ertapenem does not cover *Pseudomonas*!
  - Aztreonam (monobactam)
  - Piperacillin-Tazobactam

- Microbe causing PNA in CF patient >20 yo? *Pseudomonas*
  - Tx? inhaled tobramycin (aminoglycoside, which from the above list, we know covers Pseudomonas)

- Microbe causing PNA in CT pt < 20 yo? *Staph aureus*

- Violent cough + PEx shos subconjunctival hemorrhage or post-tussive vomiting → Pertussis
    - Microbe?
    - Tx: Macrolides, e.g. erythromycin
        - Erythromycin can also be used for gastroparesis
    - PPx for close contacts? Macrolide

- PPx for close contacts of meningitis pt? **Rifampin** or Ceftriaxone or Cipro

- Tx for acute otitis media? **Amoxicillin +/- Clavulanic acid** or Cefuroxime
    - (Cefuroxime rarely comes up)

- Tx for acute otitis externa? Fluoroquinolone ear drop
    - Microbe? *Pseudomonas*

- Pt wears contacts + has conjunctivitis or corneal ulcer. Microbe? Pseudomonas
    - Tx?
        - Ceftazidime (3rd gen)
        - Cefepime (4th gen)
        - Cipro
        - Aminoglycosides
            - **Note**: CF pts > 20 yo receive inhaled tobramycin to cover chronic Pseudomonas infection
        - Carbapenems
            - Exception: Ertapenem does not cover Pseudomonas
        - Aztreonam (monobactam)
        - Piperacillin-Tazobactam

- Tx for Measles? Vitamin A supplementation

- Tx for **C**rou**P**? Ra**C**emic e**P**inephrine
    - Microbe? Parainfluenzae (paramyxovirus)

CROSS CHECKED? yes

Ep. 45: Neurology Clerkship Shelf Review Part 2

- CSF findings of meningitis

	Opening Pressure	Cell Type	Protein	Glucose

Bacterial Meningitis		PMNs		
Fungal/Tb Meningitis		Lymphocytes		
Viral Meningitis	**Normal** or	Lymphocytes	**Normal** or	Normal

- HSV meningitis or HSV encephalitis
  - CSF findings?
    - Elevated WBCs (lymphocytic predominance)
    - Lots of RBCs (but < 1000)
      - **Note**: If 4000-5000 RBCs → think SAH instead
    - Elevated protein
    - Normal glucose
  - Location? Temporal lobe
  - Dx? HSV PCR of CSF
  - Tx? IV acyclovir

- Young adult patient + fever + headache + neurologic deficits + **no nuchal rigidity**→ brain abscess

- Headache + high fever + **sudden-onset nuchal rigidity** + → bacterial meningitis
  - CSF findings?
    - Elevated WBCs (neutrophilic predominance)
      - **Note**: in contrast, Tb meningitis is the *only* bacterial meningitis with lymphocytic pleocytosis
    - HIGH protein
    - LOW glucose

- #1 cause bacterial meningitis in children through middle-aged adults? *Strep pneumo*
  - Tx for bacterial meningitis? Ceftriaxone + vancomycin + steroids

- #1 cause bacterial meningitis in neonates? Group B *Strep* (*Strep agalactiae*)
  - Tx for neonatal meningitis? **Cefotaxime** + vancomycin + ampicillin
    - Cefotaxime covers GBS
    - Vancomycin covers *Staph aureus* & resistant *Strep pneumo*
    - Ampicillin covers Listeria

- Special bacterial cause of meningitis seen in neonates & elderly only? *Listeria monocytogenes*
  - Tx? **Add ampicillin** to standard bacterial meningitis tx

- What pathogen causes **bacterial meningitis** in **young adult** sxs of **skin petechiae**? *Neisseria meningitidis*
        - Tx? Ceftriaxone
        - PPX for close contacts? **Rifampin**, ciprofloxacin, or ceftriaxone (“RCC”)
        - Prevention? *Neisseria meningitidis* vaccine

- Pt with *Neisseria meningitidis* meningitis becomes **profoundly hypotensive** + hypoglycemic + hyperkalemic + **bleeding from mucosal sites.** Dx? → Waterhouse-Friedrichson syndrome
    - Pathophys? adrenal hemorrhage → primary adrenal insufficiency
        - Cortisol production impaired → hypoglycemia & hypotension
        - Aldosterone production impaired → hyperkalemia & non-AG metabolic acidosis (can’t excrete H+)
        - Type 4 RTA

- Populations at risk for *Neisseria* meningitis?
    - Asplenic patients (e.g. sickle cell disease)
    - Terminal complement deficiency or eculizumab use (tx for paroxysmal noctural hematuria)
        - Terminal complement = C5-C9
        - Eculizumab = C5 inhibitor

- 25 yo M having generalized tonic-clonic seizures. Began intranasal desmopressin (ADH analog) 5 days ago after water deprivation test was conducted at local hospital. Dx? → hyponatremic seizures (i.e. due to increased water reabsorption)
    - Pathophys? Desmopressin = ADH analog acts on V2 receptors of principal cells to cause increased water reabsorption → this causes dilutes serum Na+
    - Tx? Hypertonic saline
        - To raise serum Na+ levels
        - Note: cannot increase Na+ levels > 12 mEq over 24 hrs

- **What neurological complication** results **if hyponatremia** is **corrected too quickly**? Osmotic demyelination syndrome aka central pontine myelinolysis aka “locked in” syndrome

- **What neurological complication** results if **hypernatremia** is **corrected too quickly**? **Cerebral edema → transtentorial herniation**

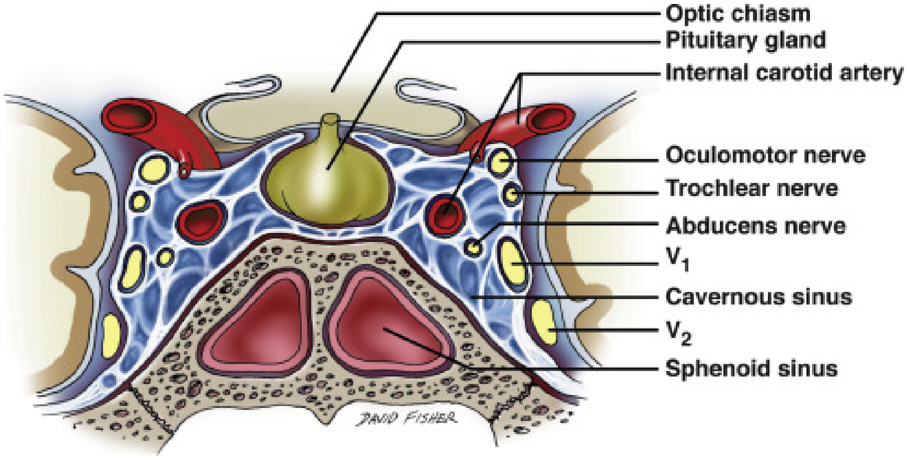
- In general, do you use a slow or fast general management strategy to manage electrolyte imbalances? **SLOW management strategy to correct electrolyte imbalances**

- **Bizarre dreams on awakening** (hypnopompic hallucination) **or on falling asleep** (hypnagogic hallucination) + history of 3 major accidents from **falling asleep while driving** + **sudden falls from LE weakness (cataplexy)**. Dx? → Narcolepsy
    - Diagnostic test? Polysomnography (will show **decreased sleep latency**, i.e. **pt goes straight into REM sleep**)
    - Tx?
        - Frequent naps

        - Modafinil (stimulant)
        - Sodium oxybate to treat cataplexy
    - **CSF findings? Decreased hypocretin/orexin levels**

- What drug is given to tx insomnia? Suvorexant
    - MOA? hypocretin receptor antagonist

- **Severe headache** + **multiple extraocular muscle deficits** + **recent otitis media infection**. → cavernous sinus thrombosis
    - Pathophys? CN III, IV, **VI**, V1, V2 go through cavernous sinus
        - **Note**: loss of CN VI function occurs first (lateral gaze palsy)
    - Ophthalmic veins anastomose with facial veins & veins that drain sinuses
    - MC organism? *Staph aureus*
    - Tx? IV abx + heparin


Optic chiasm
Pituitary gland
Internal carotid artery
Oculomotor nerve
Trochlear nerve
Abducens nerve
V_1
Cavernous sinus
V_2
Sphenoid sinus
DAVID FISHER

- **Severe headache** + **necrotic sinusitis** in **patient with blood glucose of 300** + pH of 7.13 + HCO3- of 15. → **mucormycosis** in context of DKA
    - Tx? Debridement + amphotericin B

- **Asymmetric** **resting tremor** + cogwheel rigidity + **bradykinesia/festinating gait** + postural instability → Parkinson's disease
    - Associated handwriting finding? **Micrographia** (small handwriting)
    - Associated BP finding? **Orthostatic hypotension**
    - Pathophys? Destruction of dopamine-producing cells in substantia nigra pars compacta (part of the midbrain)
    - Gross pathological finding? Loss of pigmentation of substantia nigra
    - **Histology of Parkinson disease? Lewy bodies (eosinophilic inclusions made of alpha-synuclein)**
    - Tx?
        - **Start with:**

        - NMDA receptor antagonists (e.g. amantadine; increases dopamine release in CNS)
          OR
        - Dopamine agonists (e.g. bromocriptine, ropinerole, cabergoline, pramipexole)
          OR
        - MAO-B inhibitors (e.g. rasagiline, selegiline)
          OR
        - COMT inhibitors (e.g. entacapone, tolcapone)
            - Entacapone = acts peripherally b/c does not cross BBB
            - Tolcapone = acts centrally b/c crosses BBB
    - **Last line tx? Levodopa-carbidopa**
        - Why last line? b/c only works few years then becomes less effective due to on-off phenomenon

- What **drugs** or drug class cause **drug-induced Parkinsonism?**
    - Dopamine receptor antagonists
    - Metoclopramide
        - 2 indications for metochlopramide? antiemetic, gastroparesis

- What anticholinergic drug reduces tremors of Parkinson's diseases? Benztropine (muscarinic receptor antagonist)

- **Parkinsonism** in a **young patient** that **took a "drug" at a party**? MPTP-contaminated heroin

- DDx Parkinson disease vs essential tremor
    - Parkinson's disease tremor = **asymmetric** resting tremor + **improves with activity**
    - Essential tremor = **symmetric** + **worsens with activity** + responds to propranolol

- What 2 **drugs tx acute dystonias** caused by **pt taking dopamine antagonists**? Benztropine, diphenhydramine
    - Pathophys? Dopamine antagonists cause Ach-dopamine imbalance → results in unopposed Ach overactivity)
    - **Note**: diphendramine works to tx acute dystonias b/c it has significant anticholinergic activity

- Tx of focal dystonia? Botox injection

- Tx for psychosis in pt with Parkinson's disease?

    - Reduce dose of carbidopa-levodopa
    - Quetiapine (atypical antipsychotic with weak dopamine receptor antagonist activity)
- **What Parkinson's disease drug** causes **hypertensive crisis**? **MAO-B inhibitors**
    - Tx? Phentolamine (alpha-1 blocker)

- **35 yo F** + **BMI of 35** + **visual difficulty** + **intermittent severe headaches** + being **treated for acne vulgaris**. → idiopathic intracranial hypertension

  - Risk factors?
    - Obese female
    - Vit A derivatives
    - Tetracyclines (can be used as acne tx, as in this pt)
  - **Ocular finding? Papilledema**
  - Diagnostic? **CT scan plus LP**
    - CT scan → normal
    - LP → elevated opening pressure (>250)
  - Tx?
    - Acetazolamide
    - Serial LPs

- **41 yo M** with **1 year of forgetfulness** + **behavioral changes**. His **father had similar presentation before dying at 47 y.o.** → Huntington's disease
  - Pathophys? Atrophy of caudate (part of striatum)
  - Trinucleotide repeats? CAG
  - Chromosome? 4
  - Inheritance? AD
    - With anticipation!
  - Tx? Anti-dopaminergic drugs
    - Haloperidol
    - Tetrabenazine (VMAT inhibitors)

- **Worst headache of patient's life + bilateral flank masses.** → **SAH in pt with ADPKD**
  - Pathophys? Rupture of berry aneurysm in circle of Willis
  - MC aneurysm location? **ACom aneurysm** (anterior communicating artery)
  - Associate heart murmur? MVP
  - **NBSIM? CT head non-contrast** (because blood will show up as hyperdense)
    - If CT is negative → do LP (looking for xanthochromia)
  - Tx? Lower pt's BP to 140/90
  - What drug is given to prevent superimposed ischemia? nimodipine

- Cluster headache
  - Sxs? **Unilateral tearing/conjunctival injection/rhinorrhe**a, occurs for several days
  - Tx? 100% O2 and triptans

- Tension headache
  - Sxs? **Bilateral** + **high-stress environment** + **worse at end of day**
  - Tx? NSAIDs

- Migraine headache
  - Sxs? **Unilateral** + **pulsatile** + **photophobia & phonophobia** +/- aura
  - Abortive tx?
    - Sumatriptan (5-HT receptor agonist)
      - Contraindications? variant angina aka Prinzmetal angina, CAD, CREST syndrome

      - Can trigger serotonin syndrome
    - Ergotamine
  - PPx?
    - Propranolol
    - Topiramate
    - TCA
      - Contraindications? Elderly pt's, glaucoma pt's
        - Avoid with glaucoma (anticholinergic mydriasis)
    - CCB's

- Analgesic rebound headaches
  - Sxs: use of analgesics at least 8-10x in last month; headache returns once analgesic effects wear off
  - Tx? Wean off analgesics

- **Headache + mental status changes** in patient **using fireplace to warm house** in winter → CO poisoning
  - Diagnostic? Carboxyhemoglobin levels
    - Note: Pulse O2 cannot distinguish between oxyhemoglobin and carboxyhemoglobin
  - **Tx? High-flow O2 / hyperbaric O2**
  - Imaging? Hyperintense lesions in globus pallidus on MRI

- 35 yo smoker + **right-sided headache** + **occurs everyday** at same time for past **month** + PEx notable for **rhinorrhea & pupillary miosis** on **right** → cluster headache

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Ep. 46: Neurology Clerkship Shelf Review Part 3

- A child is not doing well in school. His teacher often observes him staring into space with no awareness of his surroundings. → absence seizures
  - EEG pattern? 3 Hz spike and wave
  - Tx? Ethosuximide (T-type Ca++ channel blocker)

- 55 yo F presents with a 6 mo history of feeling like the room is spinning around her that lasts for about 3 days at a time. She has also had difficulty hearing at home. She also complains of a "ringing sound" in her ear. → Menierre's disease
  - Triad: vertigo + tinnitus + sensorineural hearing loss
  - Pathophys? Endolymphatic hydrops, poor reabsorption of endolymph in ear → high pressures
  - Tx?
    - Dietary Na+ reduction
    - For vertiginous sxs:
      - scopolamine (anticholinergic)

meclizine (antihistamine, anticholinergic)

      - diphenhydramine (antihistamine, anticholinergic)
    - Diuretics
  - Definitive tx? Gentamicin injection to ablate CN8
    - Causes of permanent sensorineural hearing loss
- Vertigo triggered by changes in position, NO hearing loss → BPPV
  - Pathophys? otoconia/otoliths in semicircular canals
  - Dx? Dix-Hallpike maneuver
  - Tx? Epley maneuver
- Recent viral URI + constant non-positional vertigo, lasts for days to weeks before spontaneous resolution, NO hearing loss → Vestibular neuritis
- Recent viral URI + constant vertigo + hearing loss → Labrynthitis

- Hit in the head with a bat, passed out for < 30s, finished out the game, now presents with severe headache and somnolence. → epidural hematoma
  - Pathophys? Fracture of frontal bone → tearing of the middle meningeal artery
  - Dx? Non-con head CT → lens-shaped hematoma
    - Do NOT perform an LP because increased ICP will cause herniation
  - Tx?
    - Neurosurgical evacuation
    - Reduce ICP
      - Elevate head of bed
      - Hyperventilate pt (CO2 down → cerebral vasoconstriction)
      - Mannitol
    - What is the quickest means of reducing ICP acutely? Hyperventilation

- Old person on warfarin with multiple falls, acting out-of-it recently OR alcoholic → subdural hematoma
  - Pathophys? Brains shrink with aging or alcoholism, stretches the bridging veins, causing greater susceptibility to shearing
  - Dx? Non-con head CT → crest-shaped
- Brain bleed in shaken baby → subdural hematoma

- Super tense muscles and T of 105 after intubation. → malignant hyperthermia
  - Pathophys? Mutation in the ryanodine receptor → increased release of Ca++ from the sarcoplasmic reticulum → hypercontractile state that generates heat
  - Inheritance? AD
  - Tx? Dantrolene (ryanodine receptor antagonist)
  - Electrolyte disturbance? hyperkalemia → peaked T waves → wide QRS → sinusoidal pattern
    - Tx?
      - 1st calcium gluconate
      - Then insulin/glucose, albuterol, or sodium bicarb
      - Kayexalate (helps excrete K+)
      - Furosemide (loop diuretic with hypokalemia as side effect)
  - Why elevated Cr?
    - Rhabdomyolysis → myoglobin release → damages kidney

        - Tx? IVF
- If same presentation after starting fluphenazine (1st gen high-potency antipsychotic) → neuroleptic malignant syndrome
    - Tx?
        - Dantrolene
        - Dopamine agonist (e.g. bromocriptine/cabergoline, amantadine)
- Hx of depression + Tx for S. Aureus bacteremia (or migraines) presents with high fevers, diarrhea, clonus → serotonin syndrome
    - Drugs that can trigger
        - Any antidepressant
        - Linezolid
        - Ondensatron
        - Triptans
        - MAO-B
        - MDMA/ecstasy
    - Tx?
        - Cyproheptadine (antihistamine with powerful serotonin receptor blocking activity)
        - Benzo

- Tremors 6 hrs after the successful completion of a AAA repair in a business executive. → alcohol withdrawal
    - Ppx? Long-acting benzo (e.g.chlordiazepoxide, diazepam)
- Tremors after starting Indapamide (thiazide-like diuretic) in a patient with a history of "episodes" where they spend tons of money/jump into severe depression. → lithium toxicity in pt with bipolar disorder
    - Pathophys? Diuretics can raise lithium levels → lithium toxicity, which manifests as tremors
    - Causes of lithium toxicity? anything that causes RAS activation (aldosterone acts on principal cell to increase Na+ reabsorption → Li+ can allow be reabsorbed through this channel)

- Child presents with bulging fontanelles and somnolence. What is the most likely region of stenosis responsible for the presenting hydrocephalus? Cerebral aqueduct of Sylvius

- 70 yo F that is forgetful. She staggers into the exam room. She has a history of recurrent perianal sores from urinary incontinence. → "wet wobbly wacky" → normal pressure hydrocephalus
    - Dx? Non-con head CT with enlarged ventricles
        - LP → normal opening pressure
    - Tx? VP shunt

- Tuberous sclerosis
    - Inheritance? AD
    - Mutated genes? TCS1 & TCS2 (tumor suppressor genes)
    - Mutated proteins? Hamartin & tuberin
    - Brain findings? Subependymal tumors (usually calcified)
    - Renal findings? Angiomyolipoma
    - Cardiac findings? Rhabdomyoma
    - Skin findings

        - Hypopigmented = ash leaf spots
        - Hyperpigmented = Shagreen patch
    - Kind of infantile seizure? West syndrome = infantile spasms
        - EEG findings? hypsarrhythmia
        - Tx? ACTH or vigabatrin

- Mom has a history of inconsistent condom use. She delivers a stillborn fetus with no brain. → anencephaly 2/2 Zika
    - Pathophys? Anterior neuropore fails to close
        - Polyhydramnios because no swallowing center
- Dimple or tuft on hair in lumbosacral area → Spina bifida occulta
    - Pathophys? Failure of the spinous processes to fuse around the spinal cord
    - Usually causes no problems
- Meningocele
    - Pathophys? Failure of fusion of the posterior neural arch → herniation of meningeal tissue and CSF
    - Associated deficiency in mom? folate
    - Tx? Surgery
    - Good prognosis after surgery
- Myelomeningocele
    - Pathophys? Failure of neural tube to close → herniation of meninges and spinal cord tissue through defect
    - Associated deficiency in mom? folate
    - Tx? Surgery
    - Worse prognosis
    - Associated dz? Chiari 2 malformation
- Type 1 Chiari malformation
    - Pathophys? Cerebellar tonsils herniate through foramen magnum
    - Associated dz? Syringomyelia ("Syr1ngomyelia")
- Type 2 Chiari malformation
    - Pathophys? Cerebellar tonsils herniate through foramen magnum
    - Associated dz? Lumbosacral myelomeningocele
- Serum marker for NTD/spinal dysraphism? Elevated maternal serum AFP
    - Also elevated ACh esterase
    - What if msAFP is decreased? Down syndrome

- Subacute combined degeneration of spinal cord
    - Vitamin deficiency? B12
    - Loss of dorsal columns → loss of vibration, touch, proprioception
    - Loss of lateral corticospinal tract → UMN signs
    - Differentiate folate & B12 deficiency with serum markers
        - Megaloblastic anemia in both
        - Homocysteine high in both
        - MMA high in ONLY B12 deficiency

- Cafe au lait spots + brown “pigments” in the axilla + “tuber like” skin growths + episodic headache and severe HTN. → NF-1
    - Eye malignancy? Optic nerve gliomas
    - Iris finding? Lisch nodules
    - Brain malignancy? Meningioma
    - Neuroendocrine malignancy? Pheo
    - Ear malignancy? Bilateral acoustic neuromas/vestibular Schwannomas in NF-2
        - Location? Cerebellopontine angle
    - Inheritance? AD
    - Gene?
        - NF-1 → neurofibromin
        - NF-2 → merlin
    - Chromosome
        - NF-1 → 17
        - NF-2 → 22

Ep. 47: Neurology Clerkship Shelf Review Part 4

- Student in a lab is unknowingly touching a lighted bunsen burner in the chemistry lab until his hand is pulled away by the TA. PE is notable for loss of pain and temperature sensation in the UEs bilaterally and mild hand muscle weakness. → syringomyelia
    - Pathophys? Obstruction in the central canal of the spinal cord → cystic expansion of central canal caudally → compression of anterior while commissure → knocks of spinothalamic tract
    - Tracts involved?
        - Spinothalamic → loss of pain + temperature bilaterally
        - If left untreated, will expand and affect the ventral horn → motor sxs (UE first because these tracts are most medium)
    - Dx? MRI

- Nuchal rigidity in a recent immigrant presenting with hemoptysis and high fevers. There is marked “enhancement” at the base of the brain. → TB meningitis
    - Dx?
        - LP
    - CSF findings?
        - Lymphocytic predominance
        - Protein HIGH
        - Glucose LOW
        - High OP
    - Tx? RIPE regimen + Vit B6
    - Differentiating meningitis from encephalitis
        - Encephalitis → more neuro deficits, may not have nuchal rigidity
        - Meningitis → nuchal rigidity

- Most common neurologic sequelae of meningitis in kids → hearing loss
- Top 3 causes of meningitis in neonates
  - GBS
  - E. coli
  - Listeria
- Empiric tx for neonatal meningitis? Cefoxamine + vanc + ampicillin
  - Ceftriaxone can cause intrahepatic cholestasis in neonates
- CSF studies in bacterial, viral, and fungal meningitis.
  - Bacterial
    - Neutrophilic predominance
    - Protein HIGH
    - Glucose LOW
  - Fungal
    - Lymphocytic predominance
    - Protein HIGH
    - Glucose LOW
  - Viral
    - Lymphocytic predominance
    - Protein high
    - Glucose low/normal
  - Patient with symmetric ascending paralysis after a recent bloody diarrheal infection → GBS after Campylobacter infection
    - CSF finding? Albuminocytologic dissociation
      - Usually WBC & protein go up together
      - In this case, high protein but new WBCs
  - 30 yo F with an afferent pupillary defect and other neuro findings → MS
    - CSF finding? Oligoclonal bands
    - Dx? MRI
  - CSF with a ton of RBCs
    - HSV encephalitis
    - Xanthochromia 2/2 SAH

- General treatment cocktail for bacterial meningitis.
  - Ceftriaxone + vancomycin + steroids (CVS)
- What should be added in the elderly, immunocompromised, or super young (infants/neonates)? ampicillin
- CSF studies with normal glucose, slightly elevated protein, and a lymphocytic pleocytosis → viral meningitis
- Classic imaging and CSF findings in HSV meningitis OR encephalitis → enhancement of temporal lobes

- 25 yo M presents with a T of 103, severe headache, and a 2 day history of profound LE muscle weakness. He was recently treated for Otitis Media. → brain abscess
  - Triad: fever + HA + neurologic deficit
    - No nuchal rigidity

    - Dx? MRI
    - Tx? Drain abscess + steroids to decrease swelling + abx
    - What is the bug that is classically associated with meningitis with MRI enhancement at “the base of the brain”? TB

- 35 yo zoologist is brought to the ED by ambulance after becoming unresponsive at home. He studies cave dwelling animals. Over the past 2 weeks he has resisted attempts by his parents to give him water or get him to the shower. → rabies
    - Prevention? Rabies immunoglobulin + vaccine (at two different sites)
    - Pathognomonic histologic finding? Negri bodies

- Bilateral acoustic neuromas → NF-2
    - Inheritance? AD
    - Gene? Merlin
    - Chromosome? 22
    - Involved cranial nerve? CN8
    - Classic brainstem location? Cerebellopontine angle
    - Dx? MRI

- Port wine stain + glaucoma + seizures + ID + tram track CT calcifications → Sturge-Weber syndrome
    - Inheritance? Non-heritable! Sporadic!
    - Gene? GNAQ activating mutation

- Woman with trouble sleeping due to weird sensations in legs → restless legs syndrome
    - Associated dz? IDA
    - Tx?
        - pramipexole/ropinirole
        - primidone

- Pt that has paresthesias over palmar aspect of hand (+ thenar atrophy → carpal tunnel syndrome
    - Associations
        - RA
        - Pregnancy
        - Hypothyroidism
    - PE maneuvers
        - Tinnel’s sign (tapping over carpal tunnel)
        - Phalen sign (flexed wrists)
    - Tx?
        - Wrist splint
        - NSAID
        - Inject steroids
        - Carpal tunnel release
    - What should be done to confirm the dx before pursuing surgery? Nerve conduction study!

Ep. 48: Neurology Clerkship Shelf Review Part 5

- 32 yo Asian M presents with severe R eye pain. PE reveals a “rock hard” unreactive pupil. → acute-angle glaucoma
    - Dx? Tonometry (eye pressures)
    - Tx?
        - Usually requires surgery: laser iridotomy
        - Medical management
            - Mannitol (lows IOP by drawing water out of the vitreous humor of the eye and into the intravascular space)
            - Acetazolamide (decreases aqueous humor production)
            - Timolol (decreases aqueous humor production)
            - Pilocarpine (muscarinic agonist, constricts pupil)

- A 3 yo F is brought to the ED by her dad. She has been using the potty continuously for the last 3 hrs. PE is notable for pupillary miosis and profuse sweating. She played in the farm this morning. → organophosphate poisoning
    - Pathophys? Organophosphates inhibit ACh esterase → ACh levels rise → parasympathetic overactivation
    - Tx? Atropine (blocks AChR) + pralidoxime (regenerated AChE)

- Flaccid paralysis after consuming home canned goods. → botulism
    - Pathophys? Botulinum toxin cleaves SNARE proteins → prevents release of ACh from presynaptic neuron
    - Tx?
        - Botulinum immune globulin
        - Intubate for respiratory support
    - Contrast to tetanus, which will have a spastic paralysis
        - Pathophys? tetanus toxin prevents the release of glycine & GABA (inhibitory NTs) from Renschaw cells → spastic paralysis
- Difficulty getting out of a chair in a patient with a 45 pack year smoking history that improves with muscle use. → LEMS
    - Pathophys? Ab to the presynaptic voltage-gated Ca++ channel
    - Increment in muscle contraction with repetitive nerve stimulation
    - Associated malignancy? Small cell lung cancer
- Difficulty swallowing and droopy eyelids in a 35 yo F with an anterior mediastinal mass → myasthenia gravis in s/o thymoma
    - Pathophys? Ab against nicotinic AChR
    - Decrement in muscle contraction with repetitive nerve stimulation
    - Dx? anti-AChR antibodies
        - Not Tensilon test anymore
    - Tx?
        - AChE inhibitors (e.g. pyridostigmine)
        - Resection of thymoma
    - In addition to tx with AChE what is NBSM? Chest CT (look for thymoma)

    - How is this condition differentiated from ChAT deficiency?
        - ChAT = choline acetyltransferase
        - ChAT deficiency sxs will not improve with AChE therapy
- Anticholinergic toxidrome = “hot as a desert, dry as a bone, red as a beet, blind as a bad, mad as a hatter”
    - Classic meds:
        - Diphenhydramine
        - TCAs
        - 1st gen low potency antipsychotics (e.g. chlorpromazine)

- Tongue fasciculations in a 6 mo. → SMA (spinal muscular atrophy)
    - Inheritance? AR
    - Pathophys? Pure LMN disease
    - Mutated gene? SMN1
    - Chromosome? 5
    - Viruses that affect anterior horn cells?
        - Polio
        - West nile
- Tongue fasciculations in a 65 yo M with asymmetric weakness. → ALS
    - UMN + LMN problems
    - Pathophys? Destruction of the UMNs (corticospinal/corticobulbar tract), LMNs (anterior horn of spinal cord), and cranial nerves
    - Genetic mutation in familial cases? SOD1, C9orf72
    - What is spared in ALS? Sensation, bowel/bladder function, extraocular muscles
    - EMG findings? Chronic denervation, fibrillation potentials
    - Tx that improves survival?
        - Riluzole (NMDA receptor antagonist, reduce glutamate excitotoxicity)
        - Bipap
    - Tx for spasticity?
        - Baclofen (GABA receptor agonist)
        - Tizanidine (alpha-2 agonist)
        - Botox injection

Dermatomyositis	Polymyositis
Kids CD4+ T-cells Perifascicular damage	Adults CD8+ T-cells (poly so it’s more) Endomysial damage

- Dermatomyositis/polymyositis
    - Ab? Anti-Jo1, anti-Mi-2, anti-SRP
    - Dx?
        - 1st muscle MRI
        - 2nd muscle biopsy

    - Lab findings? Elevated creatinine kinase
    - Associated malignancy? Lung cancer (especially small cell)

- Dysarthria + truncal, gait, and limb ataxia in a patient that is subsequently found to have lung cancer → paraneoplastic cerebellar degeneration
    - Associated malignancies?
        - Lung
        - Breast
    - Ab? Anti-Hu, anti-Yo
    - Pathophys? Tumors express cerebellar proteins, immune system tries to attack tumor but also mounts response against cerebellum

- Confusion, ophthalmoplegia, and ataxia in an alcoholic. → Wernicke's syndrome
    - What if there's also forgetfulness & confabulation → Korsakoff's syndrome
    - Tx? IV thiamine (Vit B1)
- Pharmacological management of hepatic encephalopathy
    - Lactulose (convert ammonia to ammonium, which you poop out)
    - Rifaximin (a lot of ammonia comes from bacteria in GI tract)

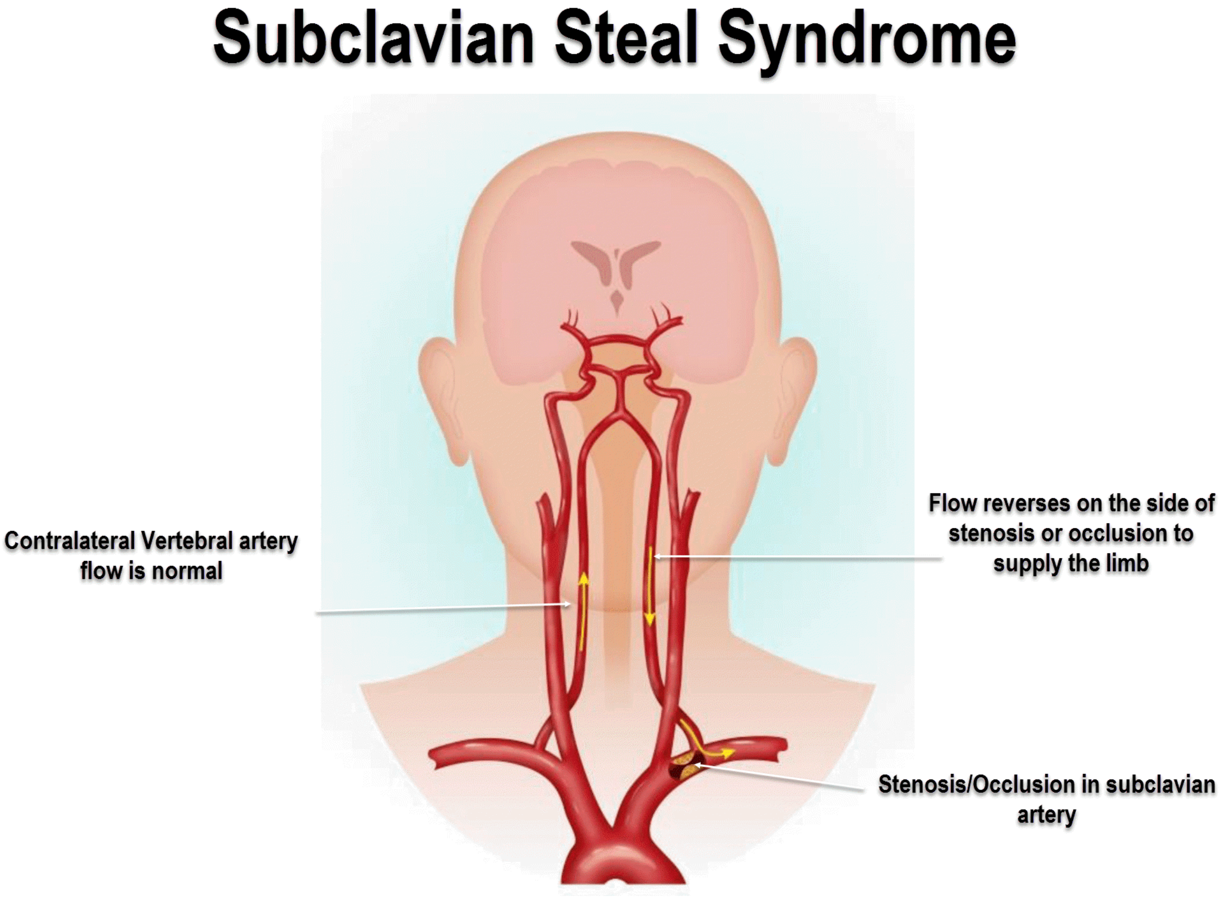
- Simple partial seizures = focal seizure w/o loss of awareness
    - Is there a loss of consciousness? NO
    - 4 types: motor, sensory, autonomic, psychic
        - Rigidity or jerking of extremity → motor
        - Hissing sound or can't see or smell burnt rubber → sensory
        - Sweating, mydriasis, rising sensation in abdomen → autonomic
    - Auras that localize to temporal lobe
        - Smelling burnt rubber
        - Deja vu
        - Rising sensation in abdomen

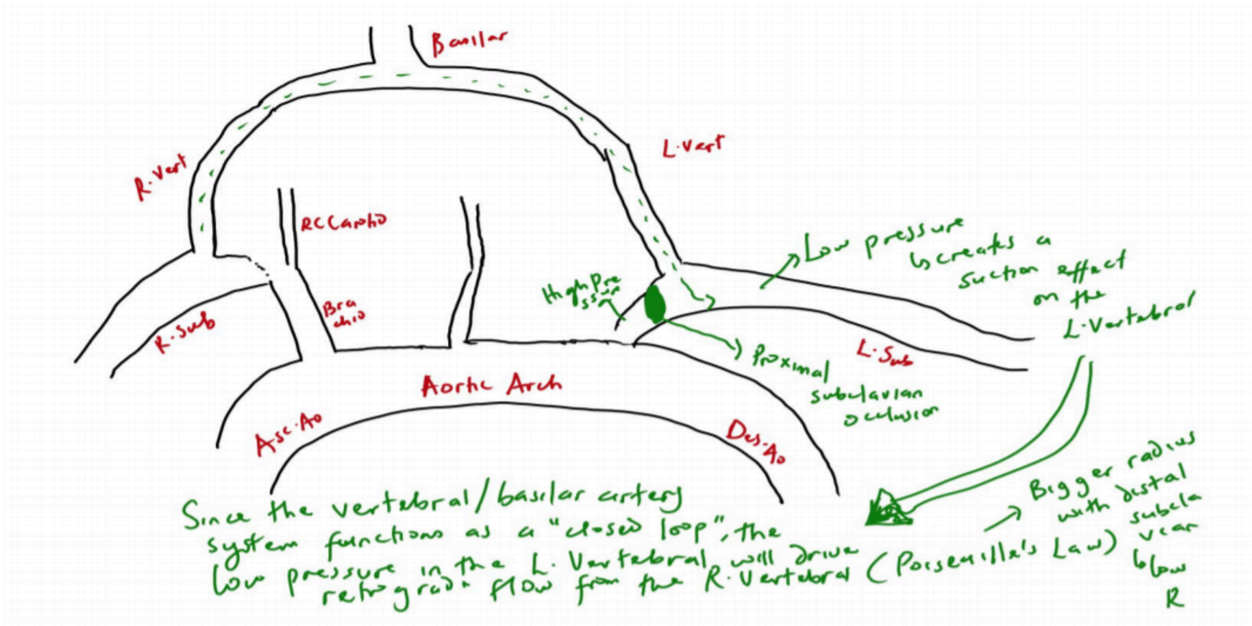
- Required imaging before recommending sports in a 12 yo with a history of Trisomy 21. Why? High risk of atlanto-axial instability/subluxation
    - Dx? Lateral neck XR
    - Another patient population at risk?
        - RA
        - Ankylosing spondylitis

- 25 yo M goes into respiratory failure. He recently recovered from a 7 day episode of bloody diarrhea. PE is notable for pronounced areflexia in the LE bilaterally. His parents report that he had muscle weakness that "started in the legs and progressed upward". He initially complained of leg tingling and numbness before his other sxs started. → GBS
    - Alternative term? AIDP (acute inflammatory demyelinating polyneuropathy)
    - Pathophys? Peripheral demyelinating disease
        - Cells affected? Schwann cells
    - Classically associated bug? Campylobacter jejuni

    - CSF findings? Albuminocytologic dissociation
    - Tx?
        - IVIG
        - Plasmapheresis
- GBS-like presentation + nystagmus + ataxia? Miller-Fisher syndrome

- Pt that has syncope or neuro deficit when they use their arms → subclavian steal syndrome
    - Pathophys? Proximal subclavian stenosis → low pressure system distal to stenosis → reversal of blood flow in vertebral arteries → “stealing” blood from basilar → hypoperfusion to brainstem

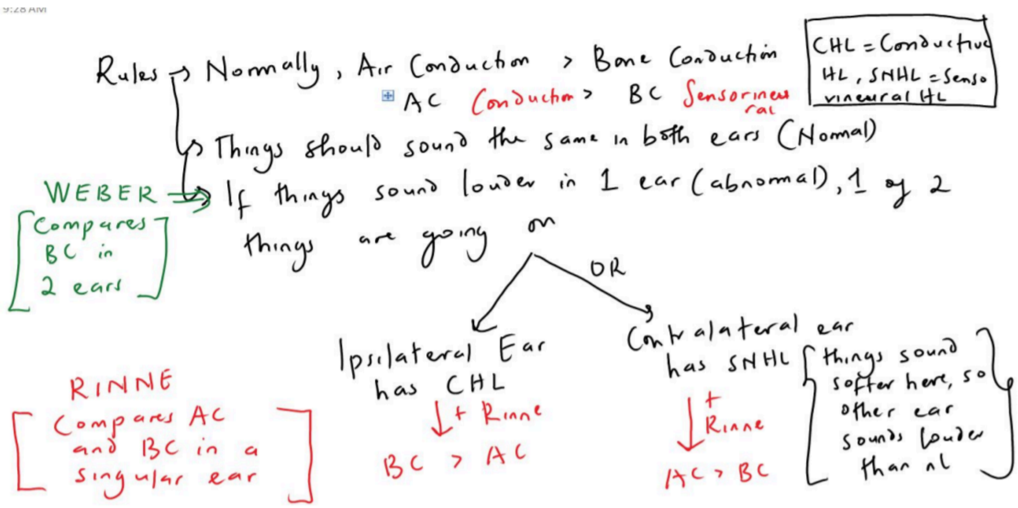

Subclavian Steal Syndrome
Contralateral Vertebral artery flow is normal
Flow reverses on the side of stenosis or occlusion to supply the limb
Stenosis/Occlusion in subclavian artery


Basilar
R. Vert
L. Vert
RCCarotid
Brachio
R. Sub
High Pressure
Low pressure ↳ creates a suction effect on the L. Vertebral
Proximal subclavian occlusion
L. Sub
Aortic Arch
Asc. Ao
Des. Ao
Bigger radius with distal subclavian blow R

Since the vertebral/basilar artery system functions as a "closed loop", the low pressure in the L. Vertebral will drive retrograde flow from the R. Vertebral (Poiseuille's Law)

WEBER & RINNE TESTS

- Weber test compares bone conduction between ears
  - Normally, it should be the same in both
  - If Weber lateralized to the R ear, there are TWO possibilities:
    - Conductive hearing loss in R ear
    - Sensorineural hearing loss in L ear
- Rinne test compares air conduction to bone conduction for each ear (single ear test)
  - Normally, air conduction is better than bone conduction
  - If bone conduction is better than air conduction, it implies conductive hearing loss



CHL = Conductive HL, SNHL = Sensorineural HL

Rules → Normally, Air Conduction > Bone Conduction
AC Conduction > BC Sensorineural
→ Things should sound the same in both ears (Normal)
WEBER → If things sound louder in 1 ear (abnormal), 1 of 2 things are going on
WEBER Compares BC in 2 ears
OR
Ipsilateral Ear has CHL
↓ + Rinne
BC > AC
Contralateral ear has SNHL
↓ + Rinne
AC > BC
things sound softer here, so other ear sounds louder than nl
RINNE Compares AC and BC in a singular ear

- Meningitis in a HIV+ patient → cryptococcus neoformans
  - How to ID?
    - India ink stain

        - Latex agglutination test
    - Tx?
        - Acutely: Amphotericin B + 5-flucytosine
        - Chronically: fluconazole

- Multiple ring enhancing lesions on MR imaging in a HIV+ patient → toxoplasmosis or primary CNS lymphoma
    - Toxoplasmosis
        - Tx? Pyrimethamine & sulfadiazine
        - Ppx for CD4 < 100? TMP-SMX
    - Primary CNS lymphoma - usually single lesion
        - Infectious association? EBV

- MMSE is 20/30 in a patient with a CD4 count of 25 and a high viral load. He last saw his PCP after an initial dx 21 yrs ago → HIV-associated dementia
    - Poor prognosis
    - Tx?
        - HAART
        - Alzheimer's drugs (e.g. rivastigmine, galantamine, donepezil)

- HIV+ patient with neuro deficits and multiple areas of demyelination on MR imaging → progressive multifocal leukoencephalopathy
    - Infectious agent? JC virus
    - Cause of drug-induced PML? Natalizumab
        - Indication? MS
        - Mechanism? Alpha-4 integrin inhibitor

Ep. 49: Neurology Clerkship Shelf Review Part 6

- Multiple neuro deficits in a kid after getting the VZV vaccine or after an URI. → ADEM (acute disseminated encephalomyelitis)
    - Pathophys? Inflammatory demyelinating lesions in brain & spinal cord
    - Dx? MRI
    - Prognosis? Full recovery

- Multiple Sclerosis
    - Classic presentations? Female in her 30s with disparate neuro deficits
        - Uhthoff's phenomenon = sxs worse in heat
    - CN2 pathology? Optic neuritis
        - Presentation? Unilateral eye pain + decreased visual acuity (e.g. 20/200) + afferent pupillary defect
    - Associated Vit deficiency? Vit D

        - Higher prevalence in places farther from the equation
    - Dx? MRI brain & spinal cord
        - Multiple demyelinating lesions separated in space & time
    - LP findings? Oligoclonal bands
    - Exam findings?
        - APD
        - Lhermitte's sign = electric shock with neck flexion
    - Tx acute exacerbation? Very high-dose corticosteroids
    - Tx chronic/DMARDs?
        - Fingolimod
        - Natalizumab
            - Mechanism
            - AE? JC virus reactivation → PML
        - Glatiramer
        - Rituximab
        - Interferon-beta
    - Tx urge & overflow incontinence?
        - Urge → oxybutynin, trospium, darifenacin/solifenacin, tolterodine
            - Detrusor muscles are hyperactive, so quiet them down with an antimuscarinic
        - Overflow → bethanechol, neostigmine
            - Alternative? Intermittent self-cath
            - Destrusor hypotonia, so activate detrusor with muscarinic agonists or AChE-inhibitors
            - High PVRs
    - Tx of spasticity?
        - Baclofen (GABA-B receptor agonist)
        - Tizanidine (alpha-2 agonist → decreases norepi release)
        - Dantrolene (CCB)
        - Benzos (GABA-A receptor agonist)
        - Botulinum toxin for localized spasticity

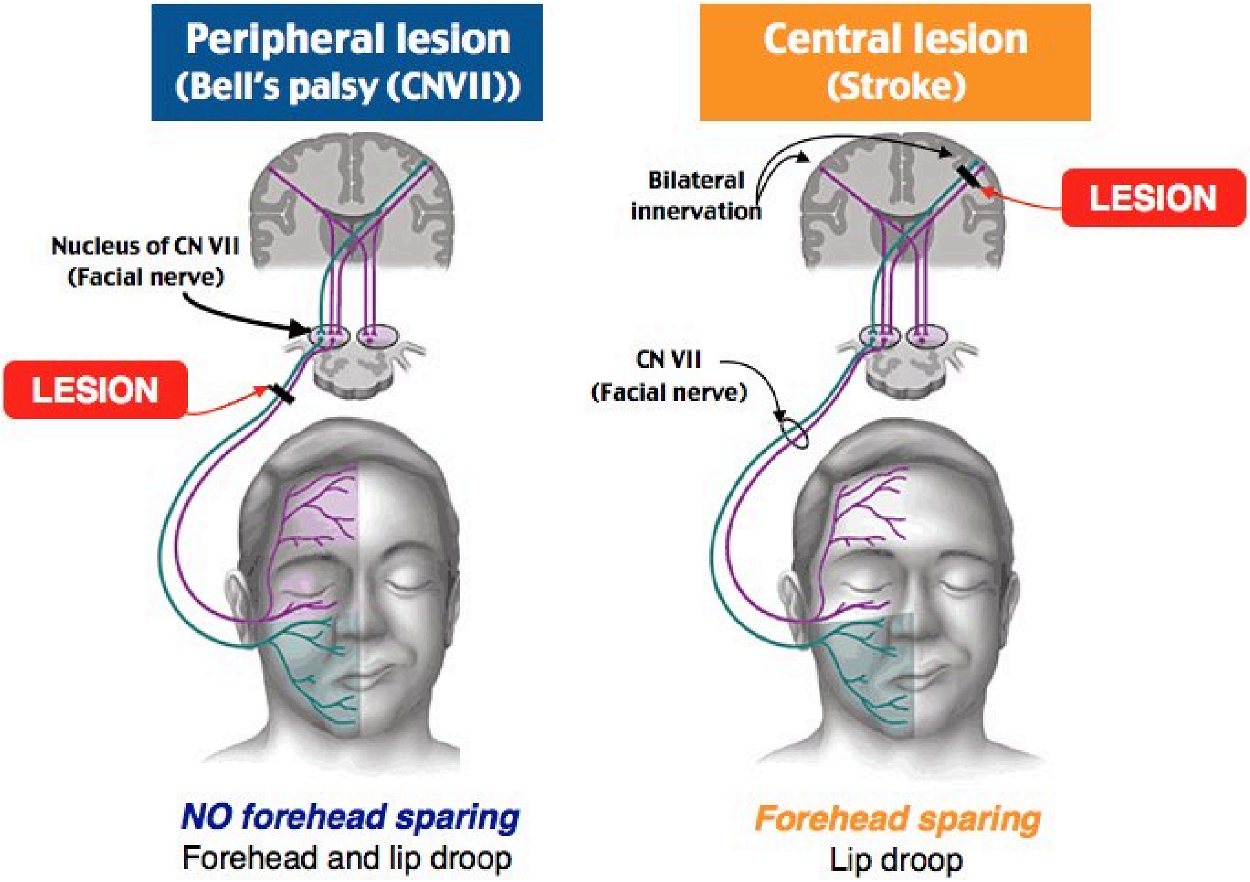
- Pt sees blood or has emotional stressor then passes out → vasovagal syncope
    - Dx? Tilt table test
    - Tx? Midodrine (alpha-1 agonist)

- Most common cause of death in patients with Factor 8/9 deficiencies? Hemorrhagic stroke
    - Pathophys? Defect of secondary hemostasis
    - Inheritance? X-linked recessive

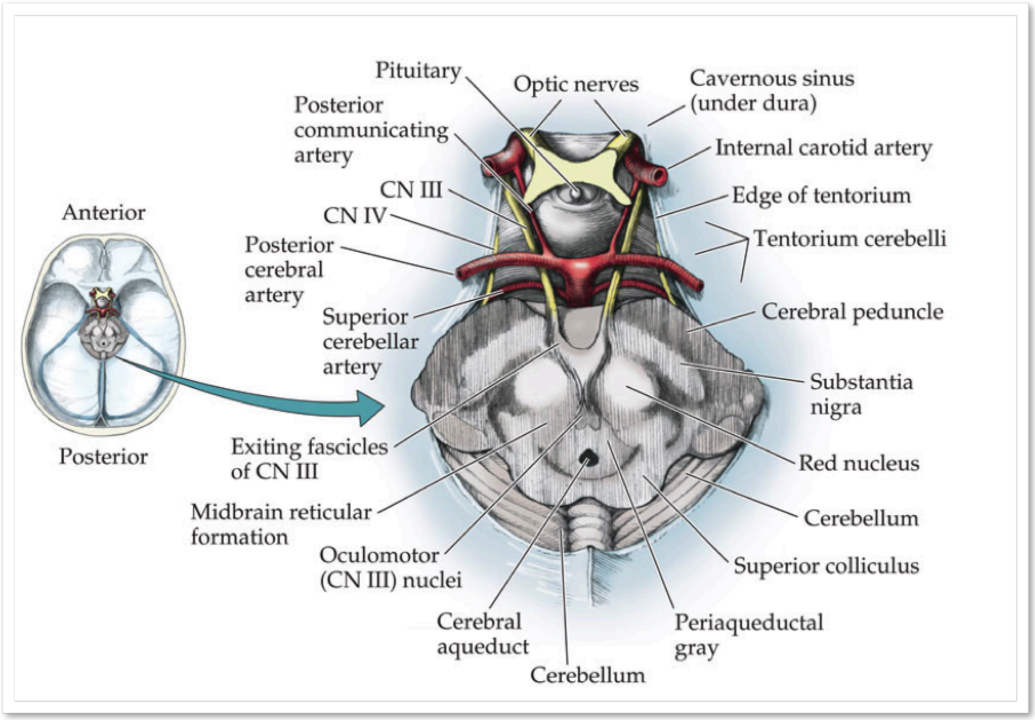
- Stepwise diagnostic testing in stroke management.
    - 1st dx step? Non-con head CT
        - Why? Differentiate b/t hemorrhagic & ischemic stroke
    - If NCCT is negative? Diffusion-weighted MRI
    - Additional diagnostics?
        - Carotid artery duplex US of internal carotid arteries

        - Echo to look for LA appendage thrombus or PFO
    - Initial tx for ischemic stroke?
        - Aspirin
        - If aspirin isn’t an answer choice, choose another antiplatelet agent
            - Clopidogrel
            - Dipyridamole
        - Do NOT give anticoagulant unless A-fib
    - If high suspicion for SAH but NCCT negative? LP → look for xanthochromia
        - Tx for SAH? Lower BP + nimodipine

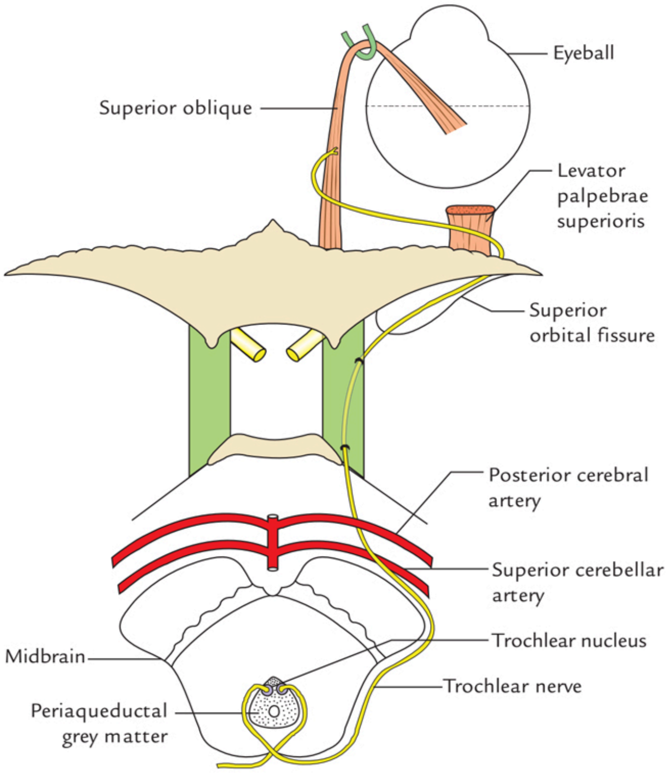
- Paralysis of ipsilateral upper and lower facial muscles, dry mouth, loss of lacrimation → LMN CN7 lesion
    - Pathway?
        - CNs (except CN2) are LMNs
        - UMNs comprise the corticobulbar tract (connect cerebral cortex to CNs)
            - Decussate prior to synapsing with CNs
        - CN7 also carries parasympathetic fibers
    - Why ipsilateral? Decussation happens upstream to CN7
- Paralysis of lower facial muscles, sparing of upper face→ contralateral corticobulbar tract lesion
    - Why contralateral? corticobulbar tract decussates BEFORE synapsing on CN7 nucleus
    - Why upper face sparing? Bilateral corticobulbar pathways that synapse on the CN7 nucleus (so you have to knock out both corticobulbar pathways to affect the upper face)

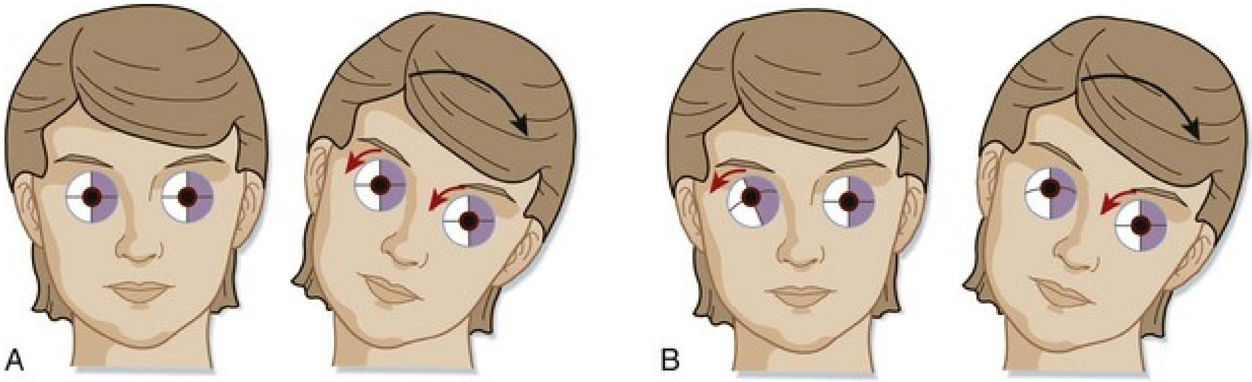

Peripheral lesion
(Bell’s palsy (CNVII))
Nucleus of CN VII
(Facial nerve)
LESION
NO forehead sparing
Forehead and lip droop
Central lesion
(Stroke)
Bilateral
innervation
LESION
CN VII
(Facial nerve)
Forehead sparing
Lip droop

- Loss of facial sensation, jaw deviation to the ipsilateral side, impaired corneal reflex. → CN5 (trigeminal)
    - Pathways?
        - Facial sensation is carried by CN5
        - Corneal reflex
            - Afferent = CN5
            - Efferent = CN7
        - CN5 provides motor innervation to muscles of mastication (e.g. masseter, pterygoids, temporalis)
- Anosmia → CN1
    - Associated syndrome? Kallman's syndrome
        - Presentation? Anosmia + hypogonadotropic hypogonadism
        - Pathophys? Failure of GnRH neurons & olfactory neurons to migrate
- Mydriasis with the eye deviated down and out. → CN3 (oculomotor)
    - Pathways?
        - CN3 innervates all muscles of eye except superior oblique (CN4 trochlear) & lateral rectus (CN6 abducens)
        - CN3 also carries parasympathetic fibers to go to pupillary constrictors
    - Why down & out?
        - Lateral rectus → abduction
        - Superior oblique → depression
    - Causes of CN3 lesions?
        - PCom aneurysm
        - Uncal herniation
    - For compression lesions, mydriasis often happens before eye deviation
        - Why? Parasympathetic fibers run on the outside of CN3 (so more susceptible to compression)
    - For ischemic lesions (e.g. due to DM), eye deviation will happen first


Pituitary
Optic nerves
Cavernous sinus (under dura)
Posterior communicating artery
Internal carotid artery
CN III
Edge of tentorium
Anterior
CN IV
Tentorium cerebelli
Posterior cerebral artery
Superior cerebellar artery
Cerebral peduncle
Substantia nigra
Exiting fascicles of CN III
Posterior
Red nucleus
Midbrain reticular formation
Cerebellum
Oculomotor (CN III) nuclei
Superior colliculus
Cerebral aqueduct
Periaqueductal gray
Cerebellum

- Bitemporal hemianopsia ("tunnel vision"), afferent pupillary defect. → optic chiasm compression
  - Causes?
    - Pituitary adenoma
    - Craniopharyngioma
    -
- Contralateral lower facial weakness with forehead sparing and loss of taste sensation with the anterior ⅔ of the tongue. → UMN CN7 lesion
  - Pathways?
    - General sensation anterior ⅔ tongue → CN5
    - Taste anterior ⅔ tongue → CN7
- Horizontal diplopia with failed abduction on lateral conjugate gaze. → CN6 lesion
- Vertical diplopia with the jaw tilted towards the side of the lesion + difficulty going down stairs. → CN4 (trochlear) lesion
  - Pathway?
    - Trochlear emerges dorsally & crosses to opposite side
    - It's the only CN that decussates
  - Note that the head tilt if TOWARDS the side of the lesion

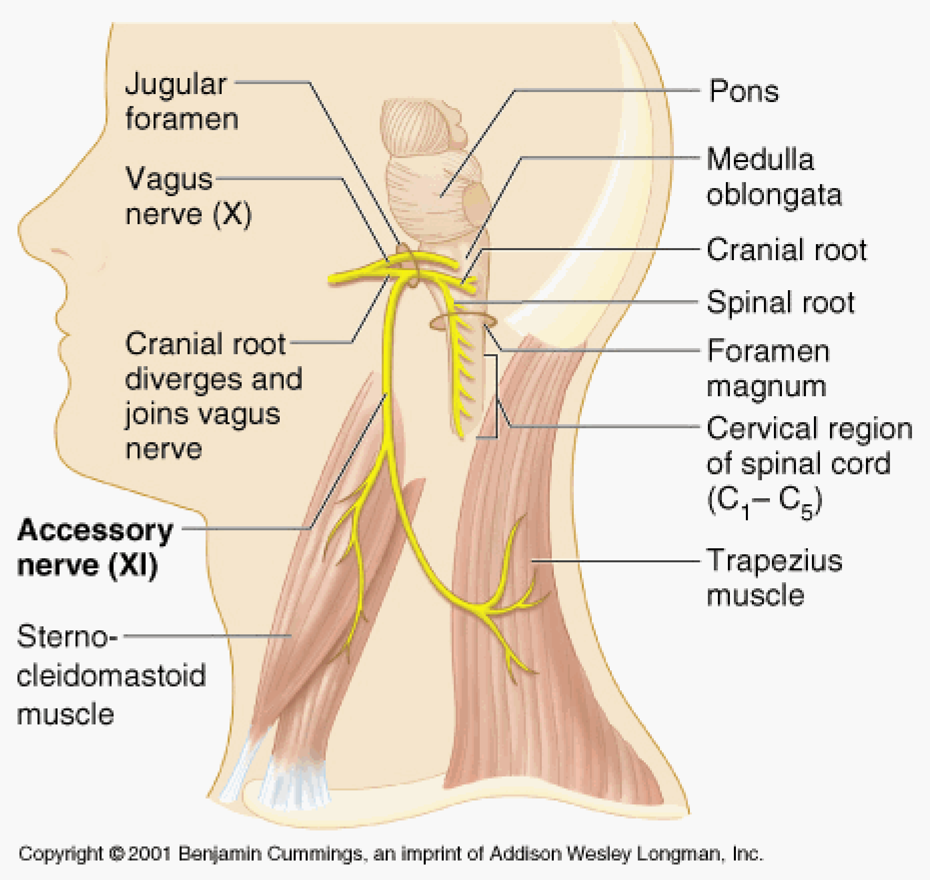

Eyeball
Superior oblique
Levator palpebrae superioris
Superior orbital fissure
Posterior cerebral artery
Superior cerebellar artery
Trochlear nucleus
Midbrain
Trochlear nerve
Periaqueductal grey matter



Normal eye rotation
When the head tilts to the left, both eyes rotate in the opposite direction (right eye extorts, left eye intorts)

Cranial nerve IV palsy (right eye)
Right eye extorted and slightly elevated causing double vision. To compensate, the patient tilts her head to the left

- Sensorineural hearing loss, vertigo, and abnormal caloric test results. → CN8 (vestibulocochlear nerve)
  - Caloric test results → COWS mnemonic (cold opposite, warm same)
- Deviation of the protruded tongue to the ipsilateral side. → CN12
  - Mnemonic “Lick your wounds”
  - Pathway? Innervates all intrinsic muscles of the tongue except palatoglossus (innervates by CN10)
- Weakness in shoulder shrug + problems turning the head to the opposite side. → CN11 (spinal accessory nerve)


Jugular foramen
Vagus nerve (X)
Cranial root diverges and joins vagus nerve
Accessory nerve (XI)
Sterno-cleidomastoid muscle
Pons
Medulla oblongata
Cranial root
Spinal root
Foramen magnum
Cervical region of spinal cord (C_1– C_5)
Trapezius muscle
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- Loss of taste sensation in the posterior ⅓ of the tongue + dysphagia + absent gag reflex. → CN9 or 10
  - Pathways?
    - Taste posterior ⅓ of tongue → CN9
    - General sensation posterior ⅓ of tongue → CN9
    - Taste extreme posterior tongue → CN10
    - General sensation extreme posterior tongue → CN10
    - Gag reflex
      - Afferent limb → CN9
      - Efferent limb → CN10
- Innervates the superior oblique muscle → CN4 (trochlear)
- Innervates the lateral rectus → CN6 (abducens)
  - Location? medially
- Anosmia + hypogonadotropic hypogonadism → Kallmann syndrome
- Differentiating between an afferent and efferent pupillary defect
  - Assume R-sided lesion
  - APD
    - Shine light into R eye → nothing
    - Shine light into L eye → bilateral constriction
  - EPD
    - Shine light into R eye → only L constriction
    - Shine light into L eye → only L constriction
    - Eye with the defect doesn’t constrict regardless

- Most common pediatric brain tumor → pilocytic astrocytoma
    - Location? Posterior fossa
- Hemorrhagic lesion in the cerebellum with a path specimen revealing some kind of rosette (perivascular, Homer Wright) → medulloblastoma
    - 2nd MC pediatric brain tumor
    - Location? Cerebellum
    - Presentation? Ataxia + elevated ICP
    - Associated syndrome? Turcot syndrome (colon cancer + brain tumors)
- Brain tumor that drains "motor oil fluid" and is calcified/could present with tunnel vision → craniopharyngioma
    - Presentation? Bitemporal hemianopsia 2/2 optic chiasm compression
    - Embryologic origin? Rathke's pouch
    - Location? Sella turcica
    - Imaging? Calcified
- Kid with abdominal mass that crosses midline with calcifications on imaging → neuroblastoma
    - Alternate location? Posterior mediastinum
    - Presentation? Opsoclonus myoclonus syndrome ("dancing eyes, dancing feet")

- Neck pain radiating to the arm with specific dermatomes affected and multiple peripheral nerves involved → cervical radiculopathy
    - Pathophys? Problem with the nerve ROOT
        - Versus myelopathy, which is a problem with the spinal cord

- Complete paralysis of the face, arms, and legs with no sensory losses and contralateral "clumsiness" → internal capsule lesion (subcortical lesion)
    - Pathway? Motor fibers from the cortex condense and form the posterior limb of the internal capsule
    - Artery involved? Lenticulostriate arteries

- Inability to calculate + eyes looking towards the side of the lesion + facial paralysis contralateral to the side of the lesion + UMN signs → cortical stroke
    - Acalcula → dominant parietal lobe lesion
        - Contrast with nondominant parietal lobe (often R) lesion → L-sided hemineglect
    - Eyes looking toward side of the lesion → frontal eye field lesion
        - R front eye field → L PPRF→ controls L abducens and R oculomotor
        - R frontal eye field lesion → no communication to L PPRF → R PPRF unopposed → R deviation

- Complete sensory loss on the left + severe pain on the right → lesion of the thalamus (subcortical lesion)

- Ataxia, past pointing, impaired rapid alternating movements (dysdiadochokinesia), and intention tremor → ipsilateral cerebellar lesion

- Bowel/bladder dysfunction + UMN and LMN findings + sensory level → spinal cord compression
    - E.g. cauda equina syndrome
    - UMN findings below level of lesion
    - LMN findings at level of lesion

- Trouble swallowing + problems with eye adduction on conjugate gaze + sensory loss on the left face + sensory loss on the "right body" → lateral medullary syndrome (Wallenberg syndrome)
    - Pathophys?
        - Sensory loss L face → L spinal trigeminal nucleus
        - Sensory loss R body → L spinothalamic tract
        - Trouble swallowing → nucleus ambiguus lesion (supplies CN9/10)
    - Affected arteries? PICA

- Hemiballismus and bradykinesia → contralateral subthalamic nucleus lesion

- Stocking/glove distribution of sensory loss + LMN findings → peripheral nerve lesion

- Trouble rising from the seated position + Elevated CK → polymyositis/dermatomyositis
    - Pathophys? Problem at the level of the muscle

- Fatigable muscle weakness → neuromuscular junction issue (e.g. MG)

- 4 signs of a basilar skull fracture.
    - Bruising behind mastoid ("Battle's sign")
    - Raccoon eyes
    - CSF rhinorrhea
    - CSF otorrhea

- peripheral neuropathy vs. radiculopathy
    - One nerve involved, stocking-glove distribution → peripheral neuropathy
    - Multiple nerves involved, dermatomal distribution → radiculopathy

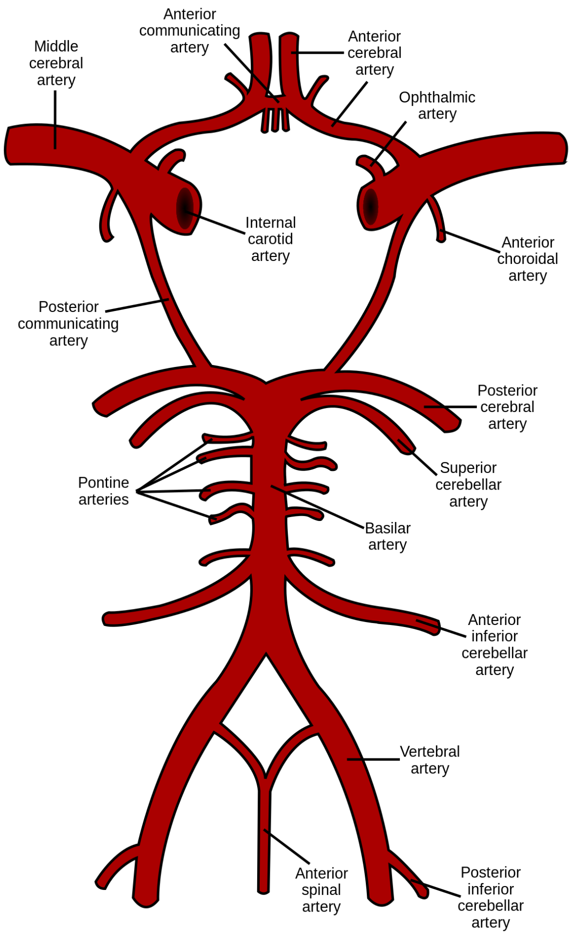
- Weakness in shoulder abduction/deltoid paralysis. → axillary nerve lesion
    - Cause?
        - Anterior shoulder dislocation
        - Surgical neck fracture
- Weakness in foot eversion and dorsiflexion → peroneal nerve lesion
    - DroPED → peroneal nerve lesion/eversion/dorsiflexion
- Weakness in foot inversion and plantarflexion → tibial nerve lesion
    - TIP → tibial/inversion/plantarflexion
- Weakness in wrist extension. → radial nerve lesion
    - Cause? Midshalf fracture of humerus
    - Reflex supplied by radial nerve? triceps
- Problems with thumb abduction with sensory losses on the ventrolateral 3.5 digits. → medial nerve compression in CTS

    - Pathophys? Compression of medial nerve by flexor retinaculum
    - Risk factors?
        - Pregnancy
        - RA
        - Hypothyroidism
- Problems with hip flexion → femoral nerve
    - F for Femoral and Flexion
- Problems with hip adduction. → obturator nerve
    - Also cannot internally rotation
    - Lots of AIR between thighs (AIR = adduction/internal rotation)
- Weakness with finger spread and problems with flexion at the MCPs and extension at the IP joints → ulnar nerve lesion
    - Pathophys? Ulnar nerve supplies the dorsal interossei, whose function is finger aBduction (spreading) + MCP flexion + IP joint extension
- Nerve roots controlling the following reflexes:
    - Biceps → C5/6
    - Triceps → C7/8 (radial nerve)
    - Knee extension/patellar tendon reflex → L3/4
    - plantarflexion/ankle jerk reflex → S1/2
- Nerve roots associated with the following levels:
    - Nipple line → T4
    - Xiphoid process → T7
    - Umbilicus → T10

Ep. 58: Neurology Clerkship Shelf Review Part 7

- Discussion of the pathway/information carried by the 3 HY spinal cord tracts:
    - DCMLS
        - Fine touch, vibration, proprioception
        - 1st order: ascends in the dorsal spinal cord → fasciculus gracilis/cuneatus → ascend ipsilaterally to caudal medulla → SYNAPSE
        - 2nd order: nucleus gracilis/cuneatus → decussates in medulla → ascend contralaterally as medial lemniscus → thalamus → SYNAPSE
        - 3rd order: thalamus → postcentral gyrus
    - Spinothalamic tract
        - Pain & temperature
        - 1st order: rises 1-2 levels → SYNAPSE
        - 2nd order: decussates via anterior white commissure → ascends contralaterally through lateral spinal cord & lateral brainstem → thalamus → SYNAPSE
        - 3rd: thalamus → postcentral gyrus
    - Corticospinal tract
        - Motor pathway

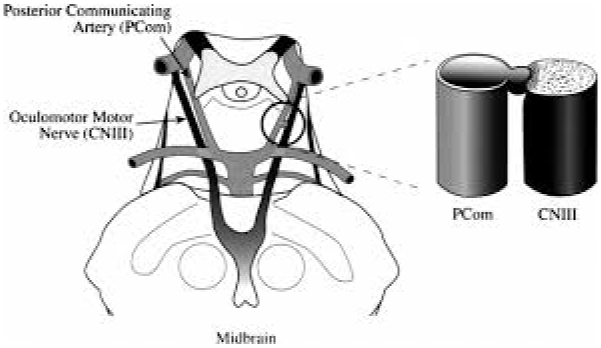
        - 1st order: precentral gyrus → travel medially in brainstem → pyramidal decussation (medulla) → ventral spinal cord → SYNAPSE
        - 2nd order: anterior horn motor neurons (LMN) → skeletal muscle
- Romberg test = close eyes while standing with feet together
    - Test of dorsal column function (proprioceptive ability)
    - Need ⅔ things to know where you are in space
        - Vision
        - Vestibular system
        - Dorsal columns
    - Examples where Romberg will be positive:
        - 3ary syphilis with tabes dorsalis
- Rapid alternating movement
    - Dysdiadochokinesia = inability to perform rapid alternating movements
    - Test for cerebellar ataxia
- Homunculus
    - Most medial: leg
    - In between: arm
    - Lateral: face
- Truncal ataxia is indicative of what kind of lesion? Cerebellar vermis


Anterior communicating artery
Middle cerebral artery
Anterior cerebral artery
Ophthalmic artery
Internal carotid artery
Anterior choroidal artery
Posterior communicating artery
Posterior cerebral artery
Superior cerebellar artery
Pontine arteries
Basilar artery
Anterior inferior cerebellar artery
Vertebral artery
Anterior spinal artery
Posterior inferior cerebellar artery

CIRCLE OF WILLIS & INFARCTION SYNDROMES

- Anterior spinal artery
  - Supplies medial medulla
  - Infarction → tongue deviation (CN12), contralateral hemiparesis (CST)
  - AAA repair: can infarct artery of Adamkowitz, which is precursor artery to ASA → anterior spinal cord syndrome
    - Lose everything in cord except for dorsal columns
- PICA
  - Supplies lateral medulla
  - Infarction → uvular deviation, swallowing issues, loss of gag reflex (CN9/10)
- AICA
  - Supplies lateral pons
  - Infarction → facial drop (CN7), CN8 dysfunction, Horner's syndrome (hypothalamic-sympathetic tract), pain & temp (spinothalamic tract)
- Basilar
  - Supplies medial pons
  - Infarction → "locked in syndrome"
- Posterior cerebral artery
  - Supplies the midbrain & primary visual cortex (occipital lobe)
  - Infarction → cortical blindness (loss of vision everywhere except macula)

        - Macula has dual blood supply from PCA & MCA
- CN3 courses between the superior cerebellar artery & posterior cerebral artery
- PCom runs along CN3
    - PCom aneurysm → compression of CN3 → parasympathetic fibers lie on the outside → loss of efferent limb of pupillary light reflex


Posterior Communicating Artery (PCom)
Oculomotor Motor Nerve (CNIII)
PCom
CNIII
Midbrain

- Most common location for aneurysms? ACom
- Anterior cerebral artery
    - Supply medial cerebral cortex
    - Infarction → LE paralysis

- Headache that is worse with sitting upright and better with lying down after a lumbar puncture → post-LP headache ("spinal headache")
    - Pathophys? CSF leak after LP → lower intracranial/intraspinal pressures → loss of cushion
    - Tx?
        - Usually self-limited
        - Can do a blood patch
        - Caffeine for pain

CN3 LESIONS

- Isolated mydriasis with sparing of other CN3 functions. Down and out pupil without mydriasis → CN3 compression
    - Pathophys? Parasympathetic fibers are on the outside, so are most affected by compression
    - What aneurysm could cause this? PCom
- Down and out pupil without mydriasis
    - Pathophys? Ischemia of CN3 → infarction of deep vasculature that supplies motor fibers, but outer parasympathetic fibers are supplied by vessels on the surface of the nerve
    - Associated condition? DM
- Down and out pupil + Mydriasis + weakness of other extraocular muscles + sensory loss over the forehead → CN3/4/6 + V1 affected → cavernous sinus thrombosis
    - Pathophys? CN3/4/5 + V1 + V2 run through the cavernous sinus
- Down and out pupil + Mydriasis + Contralateral motor paralysis → uncal herniation
    - Pathophys? Uncal herniation → CN3 compression + brainstem compression (contralateral motor deficits bc it occurs before decussation in the medulla)

CN7 LESIONS

- Recall: cranial nerves are the LMNs for the skeletal muscle in the head & neck

    - Derived from neural crest (except CN2, which is an outgrowth of the diencephalon so derived from neural tube)
    - Corticobulbar tract = UMN for cranial nerves
    - UMN cranial nerve lesion → contralateral deficit
    - LMN cranial nerve lesion → ipsilateral deficit
        - Go straight from nucleus to skeletal muscles
        - Exception: trochlear nerve (also decussates)
            - UMN trochlear nerve lesion → ipsi deficit
            - LMN trochlear nerve lesion → contra deficit
- UMN CN7 lesion → contralateral facial droop with forehead sparing
    - Pathophys? Cortical infarct
    - Why forehead sparing? Bilateral UMN innervation for forehead
    - Associated deficit? Hemiparesis on same side as facial droop
- LMN CN7 lesion → ipsilateral facial droop
- Bell's palsy
    - Presentation? Can't close mouth / can't close eye on one side
    - Pathophys? LMN CN7 lesion
    - Causes?
        - Lyme disease
            - Bug? Borrelia berdoferi
            - Vector? Ixodes tick
        - HSV
        - MS
        - Sarcoid
    - Tx?
        - Eye drops for affected eye
        - Steroids
        - Acyclovir if presumed 2/2 HSV

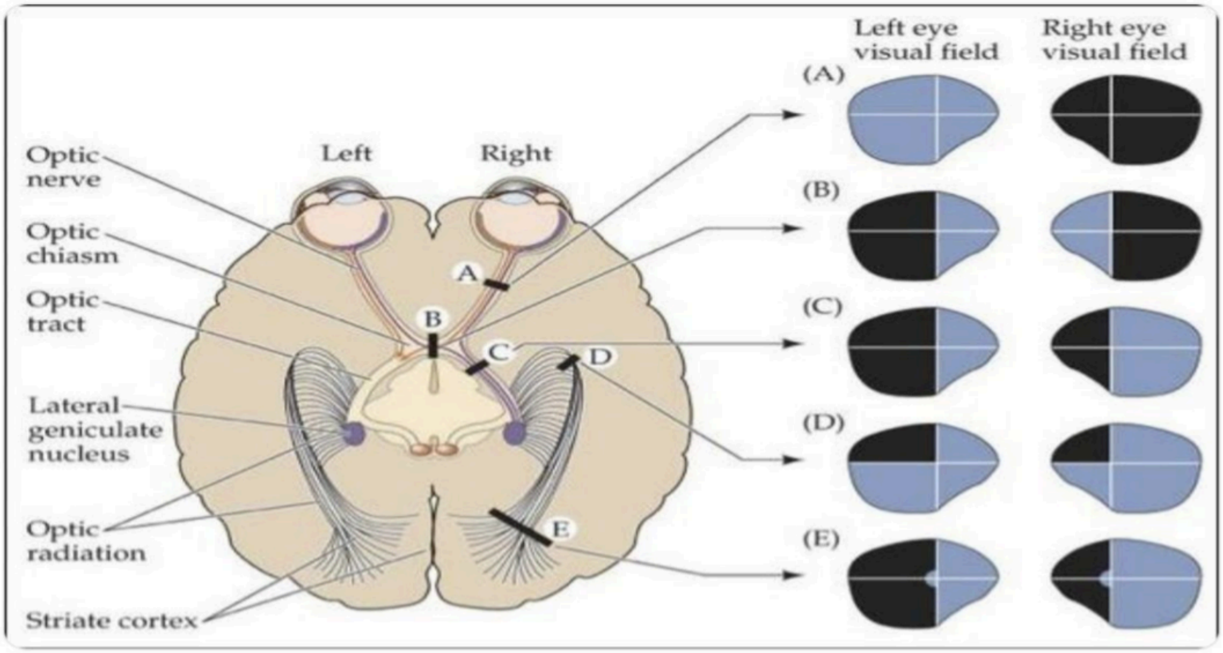
- Most susceptible CN to elevated ICP? CN6 (abducens)

- 55 yo F presents with a severe headache that appears to be concentrated just over her right eye. She has a history of jaw pain when chewing nuts and proximal shoulder pain that was relieved with low dose prednisone → temporal arteritis
    - NBSM? High-dose steroids BEFORE biopsy
    - Dx? Temporal artery biopsy
        - If one side is negative, biopsy the other side!
    - Lab findings?
        - High ESR/CRP

- 39 yo F with a PMH of MS presents with severe left eye pain and decreased vision. The right and left eye do not constrict when light is shone in the left eye. → APD 2/2 optic neuritis
    - Pupillary light reflex? CN2 afferents → pretectal nucleus → CN3 efferents
    - Dx? Slit-lamp exam

    - Tx? steroids
- 65 yo M with a past history of DM and CAD presents with a 5 day hx of decreased vision/floaters in his right eye. Funduscopic exam reveals retinal venous engorgement and diffuse hemorrhage → retinal detachment
    - Dx? US eye or ophthalmoscopy
    - Tx? Retinal reattachment procedure
- Same patient presents with the sudden loss of vision in his R eye. Funduscopic exam is notable for optic disc pallor and a cherry red spot on the macula. → central retinal artery occlusion (CRAO)
    - Dx?
        - Usually a clinical dx, but can use fluorescein angiography if needed
        - Carotid US (usually embolic from carotid plaque)
    - Tx?
        - Ocular massage
        - intra-arterial tPA
- Transient loss of vision in the same patient with a return to baseline after 10 mins. He says that it felt like a "curtain coming down" → amaurosis fugax
    - Pathophys? TIA of the eye
    - Future complication? stroke
    - Dx?
        - Carotid US

- Ischemic strokes
    - Time window for TPA administration? Within 4.5 hrs
    - Medical therapy for most strokes? Antiplatelet agent
        - Aspirin
        - Clopidogrel
    - What is the only scenario that is amenable to a consideration of heparin/warfarin administration in a stroke setting? A-fib


Left eye visual field
Right eye visual field
Optic nerve
Optic chiasm
Optic tract
Lateral geniculate nucleus
Optic radiation
Striate cortex
Left
Right
A
B
C
D
E
(A)
(B)
(C)
(D)
(E)

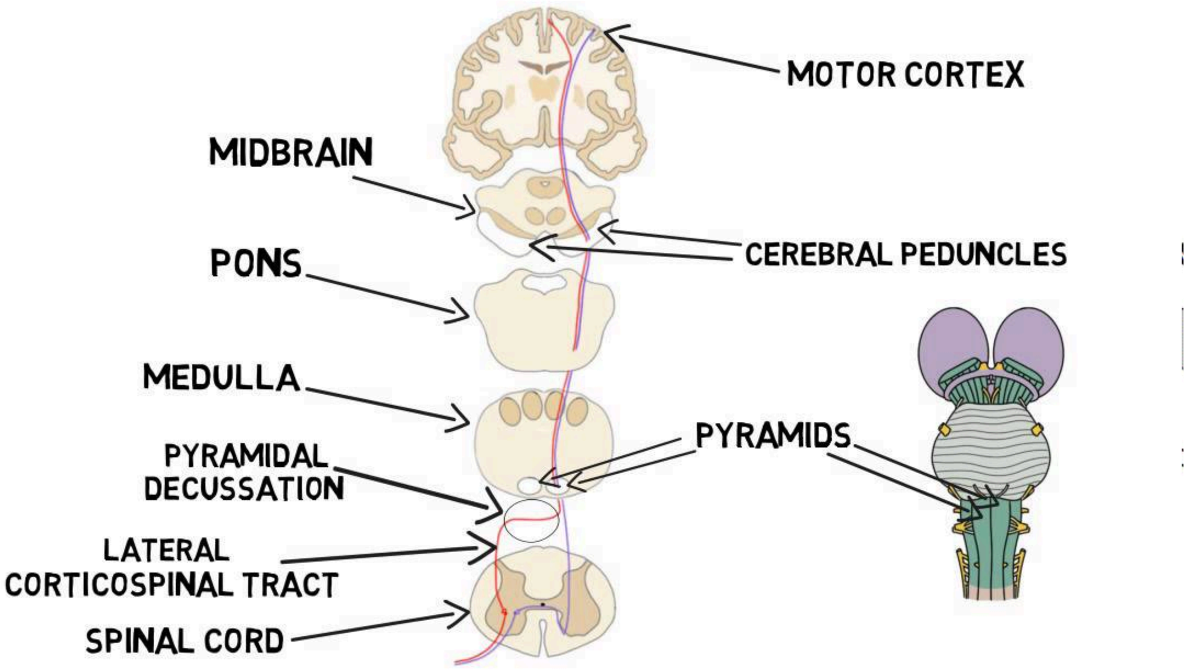
A = optic nerve → loss of vision in one eye
B = optic chiasm → heteronymous hemianopsia
C = optic tract → homonymous hemianopsia
D = Meyer's loop (lower fibers) → "pie in the sky"/superior quadrantanopia
E = visual cortex → homonymous hemianopsia with macular sparing

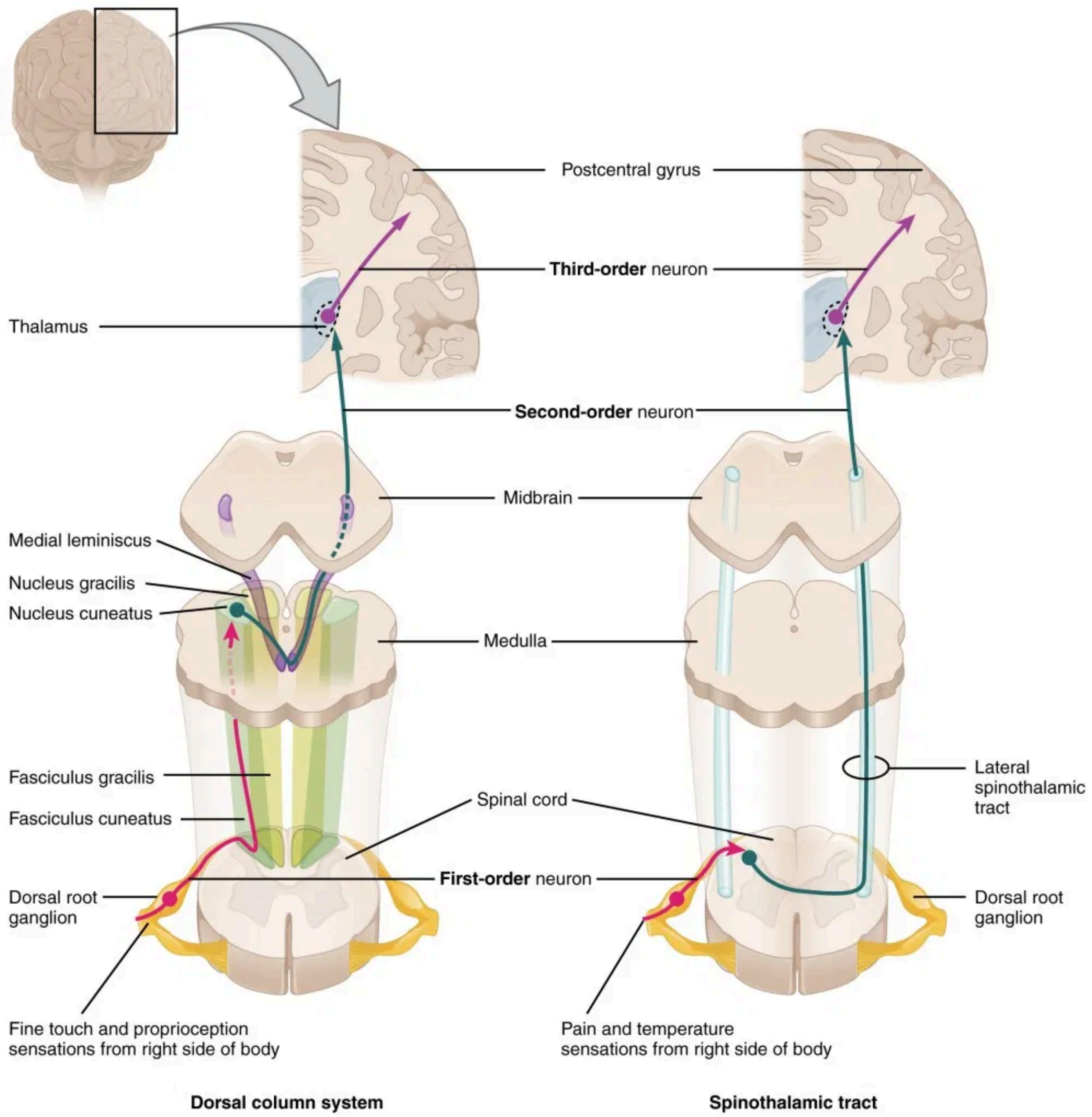
- Underlying mass in a child that presents with bitemporal hemianopsia? Craniopharyngioma
  - Imaging? Calcified suprasellar mass
  - Derived from? Rathke's pouch
- Underlying mass in an adult that presents with bitemporal hemianopsia? Pituitary adenoma
- In a cerebral cortex stroke, how would the eyes deviate in conjugate gaze (vs a brainstem stroke)? Toward the side of the lesion
  - "Into the hole, away from the fire"
    - Same side in cortical strokes
    - Opposite side in seizures
  - R frontal eye field → decussates → L PPRF → controls L CN6 & R CN3 (connected by MLF)
  - Pathophys (R lesion)? Loss of R frontal eye field → L CN6 & R CN3 not working → R CN6 & L CN3 unopposed → R gaze
  - What side would have hemiparesis? Contralateral
- In a brainstem stroke, how would the eyes deviate in conjugate gaze? Away from the side of the lesion
  - Pathophys (R lesion)? Loss R PPRF → R CN6 & L CN3 not working → L CN6 & R CN3 unopposed → L gaze
  - What side would have hemiparesis? Contralateral
    - Lesion is before decussation of corticospinal tract in medulla
- A patient with a history of MS presents with a R abduction nystagmus and impaired L eye adduction when asked to look to the right. → INO

    - Pathophys? MLF lesion ipsilateral to the eye that can’t adduct
        - L MLF lesion → signal doesn’t get to L CN3 (can’t adduct L eye)

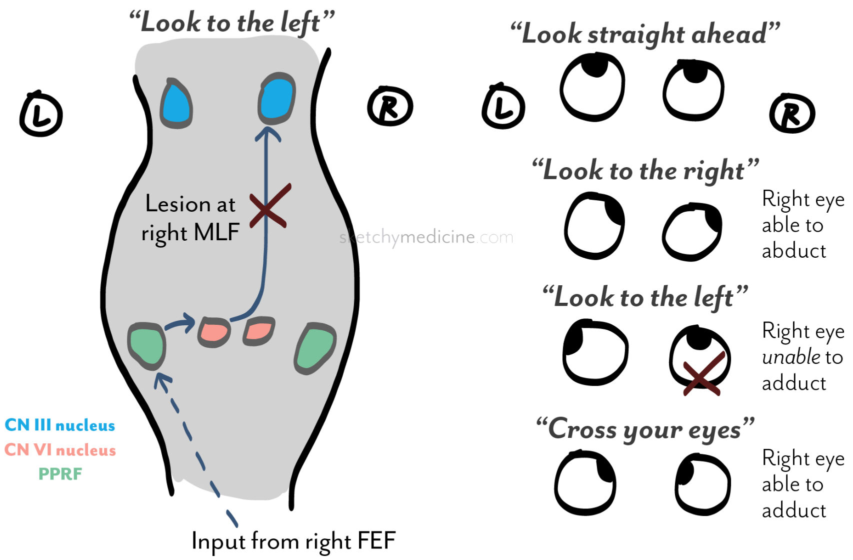
- Ptosis + miosis + anhidrosis → Horner’s syndrome
    - Locations:
        - Sympathetic trunk (Pancoast tumor)
        - Lateral brainstem stroke
    - Contract with cluster HA, which will have ptosis + miosis but NO anhidrosis

- 19 yo M visited a chiropractor for some neck massages 2 hrs ago. He was brought to the ED by ambulance after complaining of right sided neck pain. PE is notable for right sided pupillary ptosis and miosis. There are no left sided findings. → carotid artery dissection 2/2 neck trauma
    - Dx? CT/MR angiography

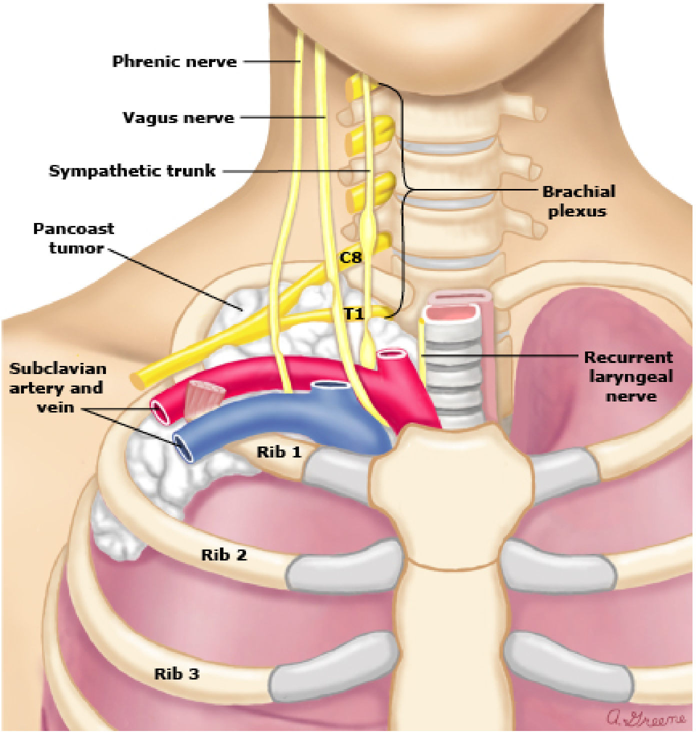

MOTOR CORTEX
MIDBRAIN
CEREBRAL PEDUNCLES
PONS
MEDULLA
PYRAMIDS
PYRAMIDAL DECUSSATION
LATERAL CORTICOSPINAL TRACT
SPINAL CORD


Postcentral gyrus
Third-order neuron
Thalamus
Second-order neuron
Midbrain
Medial leminiscus
Nucleus gracilis
Nucleus cuneatus
Medulla
Fasciculus gracilis
Fasciculus cuneatus
Spinal cord
Lateral spinothalamic tract
First-order neuron
Dorsal root ganglion
Dorsal root ganglion
Fine touch and proprioception sensations from right side of body
Pain and temperature sensations from right side of body
Dorsal column system
Spinothalamic tract

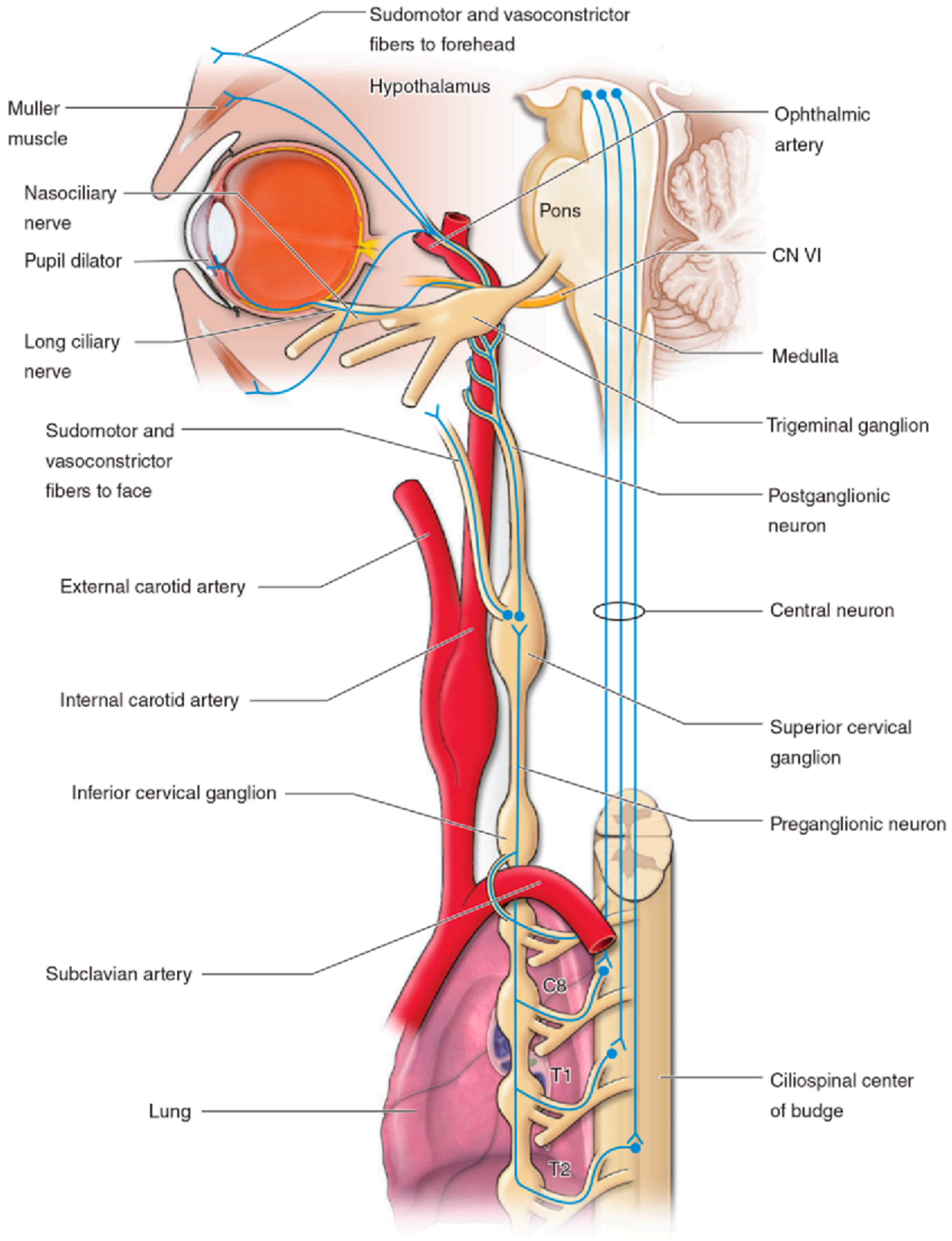
Internuclear Opthalmoplegia



“Look to the left”
L
R
Lesion at right MLF
CN III nucleus
CN VI nucleus
PPRF
Input from right FEF
sketchymedicine.com
“Look straight ahead”
L
R
“Look to the right”
Right eye able to abduct
“Look to the left”
Right eye *unable* to adduct
“Cross your eyes”
Right eye able to adduct



Phrenic nerve
Vagus nerve
Sympathetic trunk
Pancoast tumor
Subclavian artery and vein
Brachial plexus
C8
T1
Recurrent laryngeal nerve
Rib 1
Rib 2
Rib 3
A. Greene


Sudomotor and vasoconstrictor fibers to forehead
Hypothalamus
Muller muscle
Ophthalmic artery
Nasociliary nerve
Pons
Pupil dilator
CN VI
Long ciliary nerve
Medulla
Trigeminal ganglion
Sudomotor and vasoconstrictor fibers to face
Postganglionic neuron
External carotid artery
Central neuron
Internal carotid artery
Superior cervical ganglion
Inferior cervical ganglion
Preganglionic neuron
Subclavian artery
C8
T1
Lung
Ciliospinal center of budge
T2

Ep. 59: Neurology Clerkship Shelf Review Part

- Paresthesias in pt being treated for TB? INH toxicity

    - Prevention? Vit B6 (pyridoxine)

- Pt with hx of poorly treated Crohn's disease now with paresthesias + loss of proprioception + lower extremity hyperreflexia → B12 deficiency
    - Pathophys:
        - Crohn's destroys the terminal ileum, where B12-IF is absorbed
        - B12 deficiency → subacute combined degeneration of spinal cord
            - Destroy dorsal columns → loss of proprioception, vibration, and fine touch
            - Destroy lateral corticospinal tract → UMN signs (spasticity, hyperreflexia)
        - Dx? Macrocytic anemia on CBC + high MMA + high homocysteine
        - Schilling's test: inject B12 then give radiolabeled oral B12, everything is saturated so oral B12 should go to urine → if not, it indicates pernicious anemia or terminal ileum disease.
            - Then give radiolabeled oral B12 + IF.
            - If you see B12 in the urine now, the problem is pernicious anemia.
            - If not, it's probably a terminal ileum absorption issue
                - D-xylose test will be abnormal
        - Tx? Supplementation

- Ataxia and hemolytic anemia in a pt with hx abetalipoproteinemia. MRIb shows cerebellar atrophy. → Vit E deficiency
    - Pathophys? deficiency in microsomal triglyceride transfer protein which is necessary for creating beta-lipoproteins (ApoB48 & ApoB100), which transport fats, cholesterol, and fat-soluble vitamins from intestines to bloodstream
    - Peripheral blood smear finding? Acanthocytosis

- Mamillary body infarcts in a chronic alcoholic. → Wernecke's syndrome
    - Pathophys? Thiamine (B1) deficiency

- Dermatitis and dementia in a patient with a long history of carcinoid syndrome. → pellagra → 2/2 niacin deficiency
    - Pathophys? All of the tryptophan is shunted towards serotonin production, so niacin cannot be produced
    - Dx of carcinoid? Urine 5-HIAA (serotonin metabolite)
    - Other causes of pellagra?
        - Hartnup disease
            - Pathophys? Defect in neutral amino acid transporter

- Child with chronic abdominal pain and foot drop who over the past 6 mo has been performing poorly in school. → lead poisoning
    - Peripheral blood smear findings? ringed-sideroblast
    - Dx? Blood lead levels
        - Confirmatory test? Venous lead level
    - Tx? Lead chelator
        - EDTA
        - succimer

- Weird lines on the fingers + garlic breath. → arsenic poisoning
    - Derm findings? Mees lines (horizontal white lines) on nails

- Child with declining grades and many staring episodes → absence seizures
    - Seizure type? Generalized seizure
    - EEG findings? 3 Hz spike-and-wave
    - Tx? Ethosuximide (T-type CCB)
- Seizures heralded by olfactory hallucinations and a rising sensation in the abdomen → temporal lobe epilepsy
    - Seizure type? Auras = simple partial seizure
- Seizures associated with sensory/motor problems → parietal/frontal lobe seizures
- Focal post-seizure paralysis and weakness → Todd's paralysis
    - Will go away on is own in hours

- Focal seizures = partial seizures (activity localized to 1 hemisphere)
    - Focal seizure w/o loss of awareness = simple partial seizures
        - Examples:
            - Focal muscle rigidity
            - Bizarre sensations (e.g hearing hissing sound)
            - Autonomic sxs
    - Focal seizure with loss of awareness = complex partial seizures
        - Can be a person who appears awake but is not aware of surroundings
        - Presentation? Automatisms (e.g. chewing, smacking lips)
- Generalized seizures (activity in both hemispheres)
    - Absence
    - Generalized tonic-clonic
    - Atonic seizures (loss of muscle tone → pt drops to ground)
        - Also consider cataplexy in narcolepsy
    - Myoclonic seizures (jerking movements)

- Brain death = loss of all brain function, including the brainstem
    - Loss of vestibulo-ocular reflex (perform caloric testing)
    - Loss of pupillary light reflex
    - Apnea test → no spontaneous respiration after CO2 is allowed to rise
        - Hypercarbia normally stimulates respiratory center in medulla

- Reflex syncope
    - Syncope with sight of blood, emotional event, pain → vasovagal syncope
        - Dx? Tilt table test
    - Syncope after tightening tie → carotid sinus hypersensitivity
    - Pt trying to pee and they pass out → micturition syncope
- Syncope w/o prodrome in pt with ASCVD risk factors → cardiogenic syncope

- Algorithm for the management of a patient in status epilepticus.

  - 1st step: benzo (e.g. lorazepam)
  - 2nd step: IV phenytoin/fosphenytoin
  - 3rd step: sedate with phenobarbital

- AED with the strongest risk of neural tube defects → valproic acid
  - What if the patient is already pregnant and couldn't be controlled on other agents but is now well-controlled on valproic acid? Continue valproic acid
  - Why? Seizures are very dangerous to the fetus

- Involuntary flailing movement of 1 arm → hemiballismus
  - Pathophys? Lesion in contralateral subthalamic nucleus

- Involuntary movements of the jaw with no other neuro deficits relieved with "gentle stroking" (geste antagoniste) → focal dystonia
  - Tx? Botulinum toxin injection
    - Mechanism? Cleaves SNARE proteins → no vesicle fusion → no ACh release

- Fever, headache, stiff neck → meningitis
  - NBS? Head CT, especially if signs of increased ICP on exam
- Sudden onset severe headache and neck stiffness → SAH
  - NBS? Non-con head CT
- Fever, headache, and FNDs → brain abscess
  - Dx? Brain MRI
  - Tx? Broad-spectrum abx + drainage by neurosurg
- Recent history of otitis media with FNDs and papilledema on fundoscopic exam → brain abscess
- IVDU with back pain + FNDs → spinal epidural abscess
  - Dx? MRI spine
  - Tx? Broad-spectrum abx + drainage by neurosurg

- Ataxia, urinary incontinence, and dementia → normal pressure hydrocephalus
  - "Wacky, wet, and wobbly"
  - Tx? Decrease ICP with VP shunt
- Elderly patient with a MMSE of 20/30 with no past neurological history who took Benadryl last night → deliremia
  - Pathophys? Diphenhydramine has powerful anticholinergic activity
  - Anticholinergic drugs?
    - Drugs for urge incontinence (e.g. oxybutynin, trospium, darifenacin/solifenacin, tolterodine)

- MMSE 19/30 + difficulty speaking + inability to perform ADLs → Alzheimer's disease
  - What do you need before formal AD dx? Brain MRI
  - Apo association?
    - ApoE4 → higher risk
    - ApoE2 → protective
  - Associated genetic dz? Down syndrome

        - Pathophys? Amyloid precursor protein is on chromosome 21
        - Presentation? AD in 40s
    - Pathology?
        - Senile plaques (extracellular deposits of amyloid)
        - Neurofibrillary tangles (intracellular aggregations of hyperphosphorylated tau protein)
    - Neuroanatomical association? Basal nucleus of Meynert (produces ACh)
    - Enzyme association? ChAT = choline acetyltransferase
    - Tx?
        - Three select AChE-inhibitors
            - Galantamine
            - Donepezil
            - Rivastigmine
        - Memantine (NMDA receptor antagonist)

- Parkinsonian features + visual hallucinations + syncopal episodes → Lewy body dementia

- Dementia + Choreiform movements → Huntington's disease
    - Inheritance? AD
    - Repeat? CAG
    - Imaging? Atrophy of the caudate
    - Pathophys? Think of it as a high-dopamine disorders
    - Tx? Dopamine antagonist
        - Haloperidol
        - Tetrabenazine (VMAT inhibitor)

- Mild dementia + difficulty speaking + inappropriate behavior + Knife's edge appearance on brain imaging → Pick's disease = frontotemporal dementia

- "Stepwise" deterioration in cognitive function w/neuro deficits → vascular dementia
    - Presentation? 5 years ago pt started to be forgetful. 2 years ago this pt xyz.
    - RF?
        - HLD
        - CAD
        - Hx stroke
    - Tx? Cholinesterase inhibitors used in Alzheimer's
- Rapidly progressive dementia in a patient that got a corneal transplant a year ago with myoclonus → Creutzfeldt-Jakob disease
    - CSF findings? Elevated 14-3-3 protein
- Mild dementia + Urinary incontinence + gait problems. → normal pressure hydrocephalus

- Inability to calculate + left to right disorientation. → dominant parietal lobe lesion (Gerstmann's syndrome)
    - Which side in most people? Left
- Neglect of one side of the body. → nondominant parietal lobe lesion
    - Which side in most people? Right

- HY AED side effects
    - Valproate
        - Highest risk of NTD
        - hepatotoxic
    - Carbamazepine
        - Agranulocytosis
        - SIADH
        - Teratogen
    - Phenytoin
        - Gingival hyperplasia
            - Other drug? cyclosporin
        - Arrhythmias (class 1b antiarrhythmic)
        - Diplopia/visual issues
        - SJS
        - Drug-induced lupus
            - Ab? anti-histone
        - Fetal hydantoin syndrome (microcephaly + flat nasal bridge + cleft lip/palate)

- 15 yo with jerky hand movements in the morning and occasional generalized tonic clonic seizures. → juvenile myoclonic epilepsy

- Recurrent seizures + contralateral homonymous hemianopia + problems understanding speech (or can talk but speech is not understandable) + recurrent nosebleeds + Positive FOBT → Hereditary hemorrhagic telangiectasia (Osler-Weber-Rendu disease)
    - Presentation? Lip telangiectasias
    - Pathophys? AVMs in multiple organs (e.g. brain, GI tract)
        - In this example, AVM in the temporal lobe
    - Imaging? Can have dystrophic calcifications
    - Inheritance? AD
    - Contrast with Peutz-Jeghers
        - Hyperpigmented macules on lips
        - multiple nonmalignant hamartomatous polyps in GI tract
        - Increased risk of colon, pancreatic, breast, gyn cancers

- Sudden onset of redness in the eye + “bulging eyes” + “humming sound” on auscultation of the skull + visual acuity 20/100 in the affected eye → carotid cavernous fistula
    - Pathophys? Essentially an AVM
    - PE finding? Bruit on auscultation of the skull
    - Dx? MRA
    - Tx? surgery

- 12 yo M that stands from a seated position by moving his hands over his legs → Duchenne muscular dystrophy
    - Inheritance? X-linked recessive

    - Mutated protein? dystrophy
    - Pathophys? Defective cytoskeleton proteins
    - Prognosis? Death in teens to early 20s
    - Contrast with Becker muscular dystrophy
        - Inheritance? X-linked recessive
        - Pathophys? Mutated dystrophin still has some function
        - Prognosis? Live to 50s+

- Kid that is hypotonic at birth + pediatrician has trouble releasing grip from his mom during a 3 mo well child check OR 25 yo M with “severe balding” → myotonic dystrophy
    - Inheritance? AD
    - Repeat? CTG
    - Mutated gene? DMPK

- 18 yo M presents with a chief complaint of facial weakness and UE weakness that have progressively worsened over the past 18 months → facial-scapulo-humeral dystrophy
    - Presentation? Usually in teens
    - Inheritance? AD
        - Affects boys and girls!

- Polymyositis/Dermatomyositis
    - Presentation? Symmetric proximal muscle weakness
    - Pathophys? Inflammatory myopathies
    - Ab? anti-Jo1, anti-Mi2, anti-SRP
    - Derm findings in dermatomyositis?
        - Gottron's papules
        - Heliotrope rash
        - Shawl sign
    - Associated malignancy? Usually lung cancer or visceral malignancy
    - Dx? CK level
        - If elevated → MRI of muscle (no longer muscle bx)
    - Tx? Steroids
    - Which one can show up in kids? dermatomyositis

- Inclusion body myositis
    - Presentation? Asymmetric distal arm + proximal leg muscle weakness

- Toxidromes
    - Diarrhea + rhinorrhea + sweating + miosis → cholinergic
        - Causes?
            - Nerve gases (e.g. sarin)
            - Organophosphate poisoning
        - Tx? Atropine + pralidoxime
    - Mydriasis + constipation + flushing + hot skin + tachycardia → anticholinergic
        - Causes?

        - Jimson weed
  - Pt with psych hx with arrhythmia or wide QRS → TCAs
    - Tx? Sodium bicarb
  - Hypertension (possibly MI) + mydriasis + nasal septum perforation → cocaine
    - Tx? Benzos + alpha-1 blocker (e.g. phentolamine)
    - What drug is contraindicated? Beta blocker
  - AMS + rash near nose/mouth + nothing on Utox + type 1 RTA → Glue/Toluene
    - Pathophys? Glue sniffing causes hyperadrenergic response, which gives you the high. But this can also cause arrhythmias (often V-fib).
    - Electrolyte imbalance? Hypokalemia due to type 1 RTA
      - No H+ excretion and K+ reabsorption in alpha-intercalated cells
  - Miosis + respiratory depression (RR = 6) → opioid overdose
    - Tx? naloxone
    - There is no tolerance to which effects of opioids?
      - Miosis
      - Constipation
  - Normal pupils + respiratory depression → benzodiazepines (could also be barbiturate)
    - Tx? Flumazenil for benzos or Z-drugs
  - Flashbacks + visual hallucinations + synesthesias → LSD
  - Pt that is acting like the hulk + nystagmus → PCP
  - Bad oral hygiene + sympathetic activation → Methamphetamine
  - Hyperthermia + hyponatremia + affectionate behavior → Ecstasy/MDMA
  - Someone who took drugs now with parkinsonism → MPTP-mediated destruction of substantia nigra

- Symmetric descending flaccid paralysis w/o sensory deficits → botulism
- Ascending paralysis w/o sensory deficits → GBS
  - CSF findings? Albuminocytologic dissociation

- Seizing patient with small cell lung cancer with a Na of 115 → hyponatremia 2/2 SIADH
  - NBS? Hypertonic saline
    - Only indication on NBMEs is seizing pt with Na+ < 120

- 2 HY electrolyte imbalances that could cause seizures in the infant of a diabetic mother?
  - Hypoglycemia
    - Pathophys? Hyperplasia of pancreatic islet cells → hypersecretion of insulin → hypoglycemia after delivery
  - Hypocalcemia
    - Associated syndrome? DiGeorge

Ep. 65: Ventilator Physiology for the USMLEs

Episode 65 notes were graciously provided by Divine Intervention from an anonymous contributor.

4 parameters to adjust to deal with ventilator issues

1. Respiratory rate
2. Tidal volume
3. PEEP
4. FiO2

Problem with oxygen

- Pathophys: problems with oxygenation!
- Tx: adjust PEEP, FiO2
    - Increased PEEP
        - Keep alveoli open --> promotes gas exchange
            - i.e. ARDS: PCWP <18, non-cardiogenic pulmonary edema
    - Increased FiO2 = fraction of oxygen in inspired air
        - i.e. 20% --> 21%

Problem with CO2

- Pathophys: problems with ventilation!
- Tx: adjust RR, tidal volume
    - Increased RR --> breath faster --> blow off CO2
    - Increased tidal volume --> blow off CO2
    - ^opposite for low CO2
- Asthma, CO2 tension rising: NBS intubation
    - Usually, asthma pts hyperventilate --> decreased CO2

- PE --> hyperventilation --> hypocapnia
- COPD --> high CO2 tension "chronic CO2 retainers" --> compensatory metabolic alkalosis
- Pt travels to higher elevation --> oxygen tension supporting less weight (less gravity) --> atmosphere pressure goes down i.e. 760mmhg --> 750mmHg --> less O2 inhaled (FiO2 stays the same, but less absolute pressure) --> less O2 delivered to alveoli --> body compensation via hyperventilation --> blow off CO2 --> hypocapnic = respiratory alkalosis --> kidneys try to respond by getting rid of HCO3- (can help this along w acetazolamide)
- Pt overdoses on aspirin --> increased respiratory rate --> 1. respiratory alkalosis 2. metabolic acidosis
- 100% O2 not improving O2 status: **shunt**
    - Shunt physiology: perfusion without ventilation
        - i.e. PFO: blood bypassing lungs --> not getting oxygenated

Cross checked? YES

Ep. 94: Rapid Review, Series 1, Peds

1.Hemangioma + thrombocytopenia = Kasabach-Merritt Syndrome
2.Gallbladder hydrops classic association with Kawasaki disease
3.Kid is tachycardic + hypokalemic (increased activity of Na/K pump) + treated for asthma → albuterol
4.Triad: nonthrombocytopenic purpura + arthritis + abdominal pain = Henoch Schoenlein purpura
    - HSP = Risk factor for intussusception
    - Manifestation of IgA nephropathy
5.Drug of choice in tx of lyme disease in kid <8 years old = amoxicillin

  - Lyme disease spirochete, borrelia burgdorferi

6.Uveitis + joint pain (4 or less joints) = oligoarticular juvenile RA

  - Routine slit lamp exams

7.JRA RF+ with more than 4 joints involved, male, age>10, ankylosing spondylitis like picture = polyarticular JRA

8.JRA + spiking fevers + salmon colored rash = still's disease (systemic JRA)

9.MCC osteomyelitis in kid with Sickle cell = salmonella

10.MCC osteomyelitis in neonate = group B strep

11.Infection in kid from 0-28 days old = group B strep until proven otherwise

12.Kids w/ recent URI or otitis media followed by hip pain with little elevated ESR and CRP with full ROM, no leukocytosis =transient synovitis tx with NSAIDs

13.Kid okay during day, normal PE, thigh hurts at night = growing pains

14.Palpable clunk on neonate exam = developmental dysplasia of hip

15.Hip pain < 9 years old = legg-calve-perthes disease

16. Kid >9 years old + obese + hip pain = slipped capital femoral epiphysis

alphabetical order by age see previous 3 D L S

17. Hyperfunctioning athlete + pain on tibial tubercle = Osgood-schlatter

  - Buzz word = Traction apophysitis?

18. Joint pain + many bleeding episodes + elevated PTT = hemophilia a/b

19. Prodrome URI + inspiratory stridor + seal bark cough = croup aka "laryngotracheobronchitis"

  - Tx: racemic epi, steroids
  - Cause = parainfluenza virus
  - Example of Subglottic laryngitis

20. Toxic kid + drooling + dysphagia + tripoding = epiglottitis

  - Cause = h. flu in unvaccinated
  - Next step in management = intubate
  - Xray = classic thumbprint sign
  - Example of supra-glottic laryngitis

In general: Inspiratory stridor if upper airway problem

In general: expiratory wheezing if lower airway problem

21. Neonate (first 28 days of life) + wheezing + vent = bronchopulmonary dysplasia

22. MCC pneumo in child <1-2 years RSV

23. Kid (1-2 years) with expiratory wheezing + cough + moderate symptoms (tx supportively) bronchiolitis

  - RSV
  - Supportive care
  - CF or immunodeficiency pre-ppx with palivizumab

**epiglottitis/croup = stridor

**bronchiolitis = wheezing

24. DOC in pt with asthma <2/week rare at night prn albuterol

25. DOC asthma >2/week, 1-2/night prn albuterol + inhaled corticosteroids

    - If don’t see inhaled corticosteroid consider leukotriene receptor antagonists (montelukast (singular) inhibit receptor, zileuton(less used due to liver toxicity))

26. DOC more severe prn albuterol + inhaled corticosteroid + LABA
27. Continuous daily and nightly asthma symptoms add high dose inhaled corticosteroid in place of low dose + LABA/LT antagonist + oral steroids

Cross Checked: yes

Ep. 95: Rapid Review, Series 2, Peds

1. Salty baby w/ malabsorption, dx with fecal elastase = CF
    a. MCC of PNA until 21 = S. aureus
        i. Also B. cepacia
    b. MCC of PNA >21 years old = pseudomonas
    c. DF508 mutation is the MC
    d. Male infertility (congenital absence of vas deferens), rectal prolapse, nasal polyps
        i. Tx nasal polyps with inhaled corticosteroids
    e. Tx of PNA = coverage of Pseudomonas with tobramycin
        i. Pancreatic enzyme replacement
        ii. Dornase alpha (breaks phosphodiesterase in mucous)
        iii. High calorie diet
2. Calcified mass in abdominal CT scan or in posterior mediastinum = neuroblastoma
    a. Crosses the midline vs Wilms tumor which is not calcified and does not cross midline
    b. Opsoclonus myoclonus syndrome
3. Clustered seizures in child, contraction of neck and arms, EEG shows hypsarrhythmia, hypopigmented macules on skin
    a. Tuberous sclerosis, the seizures are West syndrome (infantile spasms)
    b. West syndrome tx = ACTH, also vigabatrin (GABAergic agent)
    c. Intellectual disability, nodules in ventricular system (subependymal nodule), subependymal giant cell astrocytoma, cardiac rhabdomyoma, renal angiomyolipoma
4. Generalized tonic clonic seizures in morning (teenager) = Juvenile myoclonic epilepsy
    a. Autosomal dominant, good prognosis
5. Kid w/ many kinds of seizures, bad cognitive dysfunction, EEG shows generalized spikes and slow waves = Lennox Gastaut syndrome
6. Kid not doing well in school, stares into space, no postictal state = Absence seizures
    a. EEG = 3 hertz spike and slow waves
    b. Tx = ethosuximide, T type Ca channel blocker
7. Diet to decrease recurrence of seizures = ketogenic diet
8. High fever, seizure for <15 min, no recurrence, generalized tonic clonic seizure = typical febrile seizure
    a. Tx = antipyretics
    b. Increased risk of recurrence
    c. No imaging, send them home

9. Typical vs atypical
    a. Atypical = > 15 min, recurrence within 24 hour span, focal seizure, no fever
        i. Get imaging or EEG
    b. Typical = generalized tonic clonic (NOT focal)
        i. No imaging, no EEG
10. Cafe au lait spots (hyperpigmented), chr 17 mutation = NF1
    a. Gliomas, lisch nodules on iris
    b. Pheochromocytoma
    c. Autosomal dominant inheritance
11. Triad: vestibular schwannomas, chr 22 defect, AD inheritance = NF2
12. Alzheimer in 30s, increased risk of ALL, epicanthal folds = down syndrome (tri 21)
    a. Meconium ileus from hirschsprung disease
    b. Maternal nondisjunction potential cause of DS
    c. Atlantoaxial instability
        i. Before starting sports, lateral neck x-ray
            1. Same thing for pts with ankylosing spondylitis and rheumatoid arthritis prior to surgery
    d. Increased risk of ALL
13. 6 month old kid, losing motor milestones, dies before age of 2, autosomal recessive disease = spinal muscular atrophy (Werdnig-Hoffman)
    a. Chr 5 (SMN1 gene)
    b. Hypotonic infant with fasciculations
        i. Fasciculations in adult = ALS
14. Defect in chr 15, happy puppet syndrome in girls = angelman syndrome in girls and prader willi in boys
15. Kid with large ears, large testicles, low IQ = fragile X
    a. CGG repeats
    b. X-linked dominant
16. UMN disease in a child secondary to initial insult to brain = cerebral palsy
17. Triad: MAHA + low platelet + renal failure = HUS
    a. Shigella, E.coli
    b. No steroids or antibiotics in tx
18. Kid with HTN with preceding upper respiratory infection = postinfectious glomerulonephritis
    a. Proteinuria = 2+ or less
    b. UA shows dysmorphic RBCs
    c. Low complement levels on labs, ASO/Anti DNAse B titers are high
19. Low C3 + nephritic syndrome = C3 nephritic factor seen in type MPGN
20. IgA nephropathy and Henoch Scholein Purpura
    a. Avoid rotavirus vaccine d/t intussusception
21. Membranous nephropathy associated the most with renal vein thrombosis
22. Minimal change disease associated with hematologic malignancies (leukemias, lymphomas)
    a. Light microscopy normal
    b. Electron microscopy would show effacement of foot processes
23. Kid with BP > 95th percentile = HTN in kid
24. Kid with secondary HTN, different BP in arms vs legs, delayed femoral pulse = coarctation of the aorta

    a. Associated with Turner (also bicuspid aortic valve → aortic dissection, early onset aortic stenosis)
25. Kid has secondary hypertension with flank mass that crosses the midline, increased catecholamine levels = neuroblastoma
26. Kid with secondary hypertension, episodic hypertension with headaches, increased metanephrines in urine = pheochromocytomas
    a. Flank mass that is not calcified on imaging, and does not cross midline
    b. Before surgery give alpha blocker (phentolamine, phenoxybenzamine)
27. Kid with hypertension, mom was bathing baby and felt a hard flank mass, kid has no iris = Wilms tumor
    a. WAGR
    b. Aniridia, gu anomalies, mental retardation
    c. Tx dactinomycin
28. Denys-Drash = genital anomalies, Wilms tumor
29. RUQ mass in a kid, large tongue, one side of body is larger = Beckwith Wiedeman syndrome
    a. Hepatoblastoma (RUQ mass)
    b. Can present as a newborn w/ seizures d/t increased insulin producing cells → hypoglycemia → seizures
30. Babies of diabetic moms are hyperinsulinemic in utero → after delivery, still hyperinsulinemia → hypoglycemia
31. Hypocalcemic seizures in infants of diabetic mothers
    a. 2 causes of seizures in infants of diabetic moms: hypoglycemia or hypocalcemia
    b. Hypocalcemia also seen in DiGeorge syndrome pts
32. Kid has urine problems, visual problems, hearing problems = Alport syndrome
    a. Collagen IV mutation
    b. Inherited in AD fashion (COL4A5 mutation). However, X-linked is MC

CROSS CHECKED? Yes

Ep. 97: “Most Important ”

MI = most important
MIPF = most important prognostic factor
#1 RF = most important risk factor

1. MIPF in retinal detachment → time to surgical intervention to fix
2. MIPF of Breast Ca. → 1. number of axillary LN “spread”. 2. Size of tumor
3. MI predictor of survival in aortic coarctation → Age of defect repair
4. #1 RF that predisposes to rupture of AAA → diameter of aneurysm
5. #1 RF for development of SCC of skin → cumulative exposure to sun
6. MIPF of melanoma → depth of invasion. “Breslow depth”
7. MIPF in mesenteric ischemia → bowel infarction

8. MI measure in prevention of HCC → Hep B vaccine
9. #1 RF of development of ovarian Ca → FHx of Ovarian Ca.
10. MIPF of cervical cancer → 1. stage at which it's diagnosed. 2. Involvement of pelvic/paraaortic LN
11. #1 RF of prostate ca → Age
12. #1 RF of bladder ca → smoking
13. MIPF in determining outcome of treatment in colon ca → Stage at diagnosis
14. MI test needed in dx of IE → Blood culture
15. MI complication of peritoneal dialysis → peritonitis
16. MI goal in mgmt. of COPD → smoking cessation
17. #1 RF for OSA development → obesity
18. MI disease associated with central sleep apnea → heart failure
19. MI non-pharmacologic intervention in mgmt. of osteoarthritis → exercise
20. MI modifiable RF in development of osteoarthritis → obesity
21. 2 #1 RF for development of C. diff colitis → hospitalization and Abx
22. MI opportunistic pathogen in transplant pt → CMV
23. #1 RF for development of cholangiocarcinoma → primary sclerosing cholangitis
24. 2 #1 RF in development of HCC → Cirrhosis + Hep B infx
25. #1 RF in dev of lung disease related to asbestos → cumulative exposure to asbestos fibers.
26. MI therapeutic step in mgmt. of acute pancreatitis → IV fluid resuscitation
27. MI physical exam finding in dx of AS → pulsus parvus et tardus (delayed upstroke in carotid pulse)
28. MIPF in pt with CAD → Left ventricular function
29. Most important factor in preventing lung injury when using ventilator → mechanical ventilation with lung protective strategies. I.E low TV.
30. MI oncologic association in long term celiac disease → small bowel lymphoma (enteric associated T-cell lymphoma)
31. MC disease of the retina in elderly → macular degeneration
32. #1 RF in development of pressure ulcers → immobility
33. MI physical exam finding in dx of RAS → presence of abdominal bruit
34. MIPF in preserving neurologic function in spinal cord compression → early diagnosis
35. MI factor in determining TB treatment success → adhering to treatment regimen.

Association of infectious agents with neoplasms

1. Cervical/anal/head and neck/vocal cord cancers → HPV
2. Kaposi Sarcoma → HHV-8
3. Bacillary angiomatosis → Bartonella henselae
4. Hodgkin's Lymphoma → EBV
5. Burkitt's Lymphoma → EBV
6. Lymphomas after transplant → EBV
7. MALToma → H pylori

8. HCC → Hep B + C

CROSS CHECKED? YES

Ep. 100: The Clutch Micro

1. Bloody dysentery and liver abscess→ Entamoeba histolytica
2. Foul-smelling diarrhea and recently drank contaminated water; presents in Pts with CVID or IgA deficiency. → Giardia Lamblia → do stool ova and parasites
3. Diarrhea in AIDS patient with Acid-fast oocysts in stool→ Cryptosporidium Parvo
4. Vaginal infection with green discharge and pH >4.5 → Trichomonas Vaginalis give PO Metro both partners
5. Recently came back from a developing country with thrombocytopenia, anemia, fevers every 48hrs→ P. Vivax and Ovale what if every 72 hours→ P. Malariae
6. Which Plasmodium with dominant stage in liver→ P. Vivax and Ovale
7. Patient plays with cats at home with ring-enhancing brain lesions→ T. Gondii
8. Indirect Hyperbilirubinemia with a Hgb of 8 and recently treated for malaria what dz you thinking→ G6PD deficiency
9. Diarrhea after consuming pork→ T. Solium
10. Cysts in brain from pork→ neurocysticercosis; keep back in mind consuming eggs associated with this
11. Child that itches a lot especially his buttocks→ Enterobius Vermicularis remember scotch tape test
12. Microcytic anemia and colonoscopy shows worms attaching to intestines→ Necator Americanus or Ancylostama duodenale
13. Recently came back from Egypt and recent swimming expedition→ Schistosoma Haematobium
14. Eggs with terminal spine and came back from egypt→ Schistosoma haematobium
15. Liver abscess and consumes snails→ Schistosoma Mansoni or Japanicum
16. Pt immunocompromised and diffuse markings in CXR→ PCP and silver stain +; If there A-a gradient > 35 or PaO2 <70 give Steroids with TMP-SMX
17. White lesions in Tongue of individual on chemo→ Thrush
18. Meningitis in immunocompromised→ Cryptococcus Neoformans remember latex agglutination and india ink stain
19. Ohio/Kentucky with pulm. infx→ H. Capsulatum
20. What are the bugs that cause Tinea infxns→ Trichophyton, Microsporum, Epidermophyton; Pick Trichophyton as answer mainly
21. California with pulmonary infection and spherioles on histology→ Coccidioides immitis; erythema nodosum associated with this
22. Immunocompromised pt and 10% eosinophils with RUL fungus ball→ Aspergillus fumigatus → Must bx to r/o cancer
23. Don't forget causes of eosinophilia→ Drugs, Addison's dz, Lymphoma, Collagen Vascular dzs like Scleroderma, parasite
24. Just remember order of CBC with decreasing frequency→ neutrophils most common, lymphocytes, monocytes, eosinophils, basophils; Never Let Monkeys Eat Bananas mnemonic
25. Lesions in lung, bone, skin and see broad-based bud→ Blasto
26. Gardener with lesions on one extremity and associated LAD→ Sporotrich.

27. T1DM in DKa with eschars in face→ Mucormycosis; histology shows aseptate hyphae branching at 90 degrees vs 45 degrees is aspergillus; in aspergillus a for acute angle
28. Cellulitis in a burn pt→ Pseudomonas
29. Rash with bulls-eye→ Borrelia Burgdorferi carried by ixodes tick
30. Strawberry tongue→ scarlet fever Strep. Pygoenes; may see strawberry tongue in Kawasakis as well
31. Strawberry cervix→ Trichomonas
32. Only vaginal infx with pH < 4.5 → Candida
33. Mexico with watery diarrhea→ ETEC
34. Maculopapular rash after spring-break and sexual behaviours and saw painless ulcer what stage of syphilis → 2ndry with condyloma lata
35. Febrile acute onset with nuchal rigidity → Meningitis; College student with skin lesions then its Neisseria; signs of incr. ICP must do head CT first to r/o mass lesion b/c LP will worsen them; if no signs of elevated ICP then LP; will see gram- diplococci
36. Ceftriaxone for N. Meningitidis; may empirically treat them with Ceftriaxone and Vancomycin
37. Intubated a pt with meningitis you must take ppx like rifampin, ciprofloxacin, or ceftriaxone; Rifampin 1st line but if pregnant then ceftriaxone in that circumstance
38. Whooping cough ppx → azithromycin
39. Meningitis in >60 → S. Pneumo
40. Meningitis in unimmunized infant→ S. Pneumo as well
41. Meningitis in neonate→ GBS
42. Neonate with encephalitis and mom works in pet stores→ Toxoplasma
43. Bloody diarrhea recently consumed chicken→ C. Jejuni; don't forget association with Reiters
44. Bug that has hyaluronic capsule→ Strep. Pyogenes (more for Step 1 he said)
45. Ataxic, loss sensation, sexually active female→ Tabes Dorsalis tertiary syph.
46. Pt with encephalitis weeks after undercooked pork→ T. Solium
47. HIV pt CT scan shows ring-enhancing lesions→ T. Gondii ppx with TMP-SMX; seen in CD4 count <100; If you have it then Treatment with pyrimethamine and sulfadiazine
48. Sexually active guy with arthritis and skin petechiae→ N. gonorrhoeae
49. Don't forget N. Meningitidis with Water-house Freidreich syndrome→ Hyperkalemia, hypotension, hyponatremia, Metabolic acidosis
50. Large testicles and large parotid gland→ Mumps can also cause pancreatitis
51. Sickle-cell pt with low Hgb→ Parvo causing aplastic crisis
52. Permanent flaccid paralysis in unvaccinated child→ Polio child
53. Nuchal rigidity in 2 week old child→ GBS most common in first 4wks of life
54. Most common bacterial cause in STDs in U.S→ Chlamydia D-K
55. Most common cause of UTI→ E. Coli then its S. sapro
56. Elevated liver enzymes in pregnant women that then dies→ HEV
57. Influenza virus has segmented genome reason for epidemics/pandemics
58. Sore throat with viral conjunctivitis--> adenovirus; assoc. with hemorrhagic cystitis and gastroenteritis
59. Black-eschar in diabetic→ Pseudomonas ecthyma gangrenosum
60. Viral myocarditis→ Coxsackie B; A is assoc. Hand-foot-mouth dz
61. Conjunctivitis, jaundice after visiting Hawaii→ Leptospirosis
62. Kid that goes to day-care and has rash → Parvo B19
63. Cough, coryza, rash, conjunctivitis, koplik spots→ measles; cephalocaudal rash
64. Kid with gastroenteritis and immigrant and becomes quadraplegic→ poliovirus is an enterovirus

65. Pt with cervical cancer and sexually active→ HPV 16, 18, 31, 33; Most common cause of death in pt with cervical cancer is renal failure!
66. Triad of parotitis, orchitis, infertility→ Mumps
67. Cataracts, blindness in newborn→ Rubella assoc. With PDA= wide-pulse pressure; he's obsessed with cardio
68. Painful skin lesion in dermatomal pattern→ VZV stays dormant in dorsal root ganglia tx with acyclovir and if resistant then foscarnet (pyrophosphate analog)
69. Genital warts → HPV 6, 11 condyloma accuminta
70. Retinitis or colitis in AIDS pt or recent transplant→ CMV with intranuclear inclusion bodies tx w. Ganciclovir
71. Painful vesicles on erythematous base→ HSV 2; 1 is associated with oral ulcer
72. Pregnant women with high ALT/AST and high mortality→ Hep. E
73. Watery diarrhea in cruise-ship→ Norovirus "Norwalk Virus"
74. Young sexually active female feeling wiped and LUQ mass/splenomegaly, atypical lymphocytes, post. LAD→ EBV; don't be hung up with post. Cervical LAD; they've been writing questions with ant. as well
75. Kid with really bad watery diarrhea→ Rotavirus assoc. w/ genetic reassortment; vaccine is c/a in pts with hx of intussusception or Meckel's diverticulum
76. Two most common causes of common cold→ rhino and coronavirus (F U Covid)
77. Pneumonia with exp-wheeze in <2yrs→ RSV; if high-risk you may ppx with Palivizumab; Uworld says if premature <29wks, chronic lung dz, or unstable CHD
78. Fevers, myalgia around December→ Influenza
79. Pt bitten by an animal and has encephalitis and hydrophobia→ Rabies is a rhabdovirus
80. Neonate with encephalitis and LP shows RBC or temporal enhancement on CT→ HSV with elevated lymphocytes on LP
81. Erythema chronicum migrans→ lyme dz
82. Erythema Marginatum→ Group A Strep
83. Erythema infectiosum→ Slapped-cheek finding with parvo
84. Ecthyma gangrenosum → Pseudomonas
85. Kid with choreiform movement with arms and sore throat recently→PANDAS: Pediatric Autoimmune Neuropsych Disorder Assoc. With Group A strep
86. Painless chancre→ T. Pallidum; indurated raised edges
87. Painless ulcers in genitals no inguinal LAD→ Klebsiella granulomatis; intracellular donovan bodies; painless ulcer with beefy-red base
88. Histology shows epithelial cells with inclusion bodies→ HSV-2; he laughs and thinks you're hilarious for thinking histology is low-yield
89. Genital warts→ HPV 6/11
90. Urethral discharge gram-stain is gram - diplococci→ N. Gon.
91. Painless ulcer and becomes massive painful LAD→ Lymphogranuloma venereum Chlamydia Trachomatis L1-L3
92. STI w/ dark-field microscopy. → T. Pallidum
93. Painful ulcer w/ inguinal LAD→ H. Ducreyi
94. Painful vesicles→ HSV-2
95. Septic arthritis and urethral discharge→ N. Gonor.
96. STI tx with macrolide or doxycycline→ Chlamydia

97. Chlamydia A-C type causes trachoma most common cause of blindness in developing world; D-K causes STIs; L1-L3 for painless ulcer and inguinal LAD
98. Give Ceftriaxone and Doxy for → N. Gonorrhea infxn
99. Rash patterns: Rash on palms soles and trunk with recent painless chancre→ Syphilis
100. Sandpaper rash on trunk, strawberry tongue→ Scarlet fever (Group A Strep)
101. Rash starts on face and descend caudally→ Measles
102. Rash on palms and soles and migrates centrally→ RMSF give doxy even if <7yrs old but if pregnant give chloramphenicol
103. Rash palms soles lesions in mouth → Coxsackie A
104. Rash lasting for 3 days→ Rubella talk about posterior auricular lymphadenopathy
105. Pt 2-4 age rage with pneumonia→ RSV
106. Pneumonia in teens→ Mycoplasma
107. Elderly pneum.→ S. Pneum.
108. HIV with interstitial infiltrates→ PCP but if lobar consolidation then S. Pneum.
109. Pneumonia in alcoholic→ Klebsiella
110. Alcoholic with foul-smelling sputum→ anaerobic pneum
111. Pneumonia with interstitial infiltrate and pet store owner/bird handler→ Chlamydia (psittaci)
    Something I couldn't figure out what he was saying @ 41:55
112. Live in Kentucky/Ohio went into caves for spelunking→ Histo.
113. Pneumonia recently visited New Mexico→ Coccidioides
114. Pneumonia with rose-colored sputum→ S. Pneum
115. Red-currant jelly sputum→ Klebsiella
116. Pneumonia, hyponatremia, diarrhea→ Legionella
117. Pneumonia and handle cow poop→ Coxiella Burnetii Q fever and also endocarditis culture negative type
118. Cystic fibrosis with pneumonia <20→ S. aureus if >20 Pseudomonas or Bokoderius Sepacia
119. 3 most common causes of atypical pneumonia → Mycoplasma, Chlamydia, Legionella cover with Macrolides; has a M, C, L in it so remember that way for tx
120. Erythromycin is a motilin receptor agonist used for gastroparesis and macrolides prolong QT interval and inhibit 50S ribosome
121. Pneumonia in neonate and find gram + cocci→ GBS
122. Sputum of Gram - rods in neonate→ E. Coli
123. Pneumonia and exp. Wheeze in neonate→ RSV presents with exp. Wheeze not stridor which is either Croup or Epiglottitis
124. FBIworker or postal worker with widened mediastinum on CXR→ Bacillus anthracis and remember it's made out of polyglutamate (protein)
125. Person with pneumonia then with lung abscess/cavitations→ S. aureus
126. Pneumonia in IV drug abuser and septic emboli→ S. aureus
127. Pneumonia w/ worsening of sxs→ S. aureus
128. Classic anaerobes→ Peptostreptococcus, Fusobacterium, Bacteroides
129. Pt with water diarrhea and recent travel→ ETEC
130. Water diarrhea thats rice-water→ Vibrio
131. Hiker or camper diarrhea→ Giardia
132. Cruise ship diarrhea→ Noro
133. Diarrhea in infant→ rotavirus

134. Diarrhea in immunosuppressed→ Crypto tx with nitazoxanide
135. Bloody diarrhea after eating beef→ C. jejuni or EHEC/Shigella remember HUS and relation with schistocytes and hemolytic anemia
136. Bloody diarrhea after poultry or eggs→ salmonella
137. Bloody diarrhea thats a lactose fermenter→ EHEC
138. Most common cause of bloody diarrhea in US→ C. jejuni and may get GBS symmetric ascending paralysis
139. Pt w/ diarrhea and recent tx of anaerobic infx→ C. Diff.
140. Diarrhea that feels like appendicitis in LLQ pain→ Yersinia enterolytica
141. High yield protozoal cause of bloody diarrhea in NBMEs→ Entameba histolytica
142. Bloody diarrhea that need just 10 or so bugs to cause it → Shigella
143. Bloody diarrhea with fever, low Hgb, low platelets→ EHEC
144. Watery diarrhea after oysters or seafood--> V. parahaemolyticus
145. Diarrhea after oysters and elevated AST and ALT especially in those with Liver dz→ V. Vulnificus
146. Water diarrhea after swimming in fresh water or aquarium→ Aeromonas; A aquarium A Aeromonas
147. Diarrhea with massive amounts of e- abnormalities→ V. Cholera
148. Korean BBQ with watery diarrhea espec. Fried rice→ B. Cereus
149. Diarrhea after two hours having potato salad→ S. Aureus also vomiting
150. C. Perfringens also may cause diarrhea
151. Swims in freshwater then dies after→ Naeglerii flower
152. Fever and new-onset murmur in IV drug abuser -->S. aureus
153. Fever and recent dental procedure→ S. Viridans
154. Fever and heart murmur in prosthetic valve→ S. epidermidis!!!!!!!!
155. Fever and heart murmur after sore throat→ S. Pyogenes
156. If It comes from UTI → enterococcus
157. S. Pyogenes IE attacks left side of heart vs S. aureus on right side of the heart
158. You cannot prevent PSGN w/ penicillin
159. Sterile vegetations on each side of the valve→ Libman-sack Endocarditis assoc. with SLE

CROSS CHECKED? No

Ep. 102: The “Clutch” cancer podcast (IN PROGRESS)

1. Kid presenting with ataxia and necrotic mass in middle cerebellum(around vermis) on imagining - medulloblastoma
    1. If you saw an answer w juvenile pilocytic astrocytoma choose this first because they have a similar presentation
2. pilocytic is the most common brain tumor in kids
    1. Arises in posterior fossa in the cerebellum
    2. Contain eosinophilic fibers= rosenthal fibers
3. Person with brain mass attached by a dural tail (aka parasagittal mass)or they say mass is stuck to meninges meningioma

    1. Histo finding= psammoma body
4. Bilateral hearing loss + hx of genetic disease nf2 (chromosome 22)
    1. Ptn: bilat acoustic neuromas or schwannomas at the cerebello pontine angles
5. Versus in nf1 chromosome 17
    1. Café au lait spots + skin neurofibromas + optic nerve gliomas
    2. Also acoustic neuroma , but acoustic neuroma is more highly assoc with nf2
6. Farmer + had multiple rough lesions on forehead + sun exposure. Multiple lesions all over face, forearms actinic keratosis
    1. #1RF Sun exposure
    2. usually self resolves
    3. High risk of progression to squamous cell carcinoma
7. Skin findings for melanoma? ABCDE
    1. Asymmetry, borders, color variation, diameter >6mm, evolving character and appearance
    2. Melanoma prognostic factor is breslow depth
    3. Can arise under nails = acral lentiginous. Mc in african americans
8. Lesion on face, pearly gray papules, telangiectasia above the lip basal cell cancer of the skin
9. squamous cell cancer of skin
    1. Marjolin ulcers (non healing)
10. Bone pain, fevers, + xray with sunburst osteosarcoma
    1. Also see: codman triangle
    2. RFs: Retinoblastoma, Pagets, Teriparatide (PTH analog)
11. 2 yo + htn, flank mass. Ct abd mass that crosses midline with calcifications neuroblastoma
    1. Posterior mediastinal mass (neurogenic origin)
    2. histology = homer wright pseudorosettes
    3. N-myc oncogene
    4. Opisthoclonus myoclonus association
        1. “weird hand movements” and “weird eye movements”
12. Child + htn, but no calcified and no crossing midline Wilms tumor
    1. Wagr—wilms, aniridia, gu anomalies and retardation
13. Child + choreiform arm movements PMH sore throat Rheumatic fever. Called PANDAS
    1. Pediatric autoimmune neurocyte disorder assoc with strep (group A)
14. Episodic HA + HTN, encephalopathy that is periodic with HIGH BP pheochromocytoma
    1. Chromaffin cells of adrenal medulla
    2. Nicotinic Ach receptor
    3. Pheo check urinary and serum metanephrine
    4. Before surgery must block alpha before blocking beta to prevent unopposed alpha 1 stimulation
        1. Similar to cocaine OD (give benzo, or phenoxybenzamine or phentolamine or a-b blocker)
15. Pheo + Genetic association= MEN2

    1. 2 A and 2B
        1. 2a==medullary thyroid cancer pheochromocytoma, and primary hyperparathyroidism
            1. Hyper parathyroid due to parathyroid hyperplasia
        2. 2b—medullary thyroid cancer, pheochromocytoma, and mucosal neuromas + marfanoid habitus
    2. Pheo also associated with NF1
16. tumor marker for Medullary thyroid cancer = calcitonin
    1. Stain Congo red
    2. If you see amyloid around the thyroid gland—think medullary thyroid cancer. The calcitonin deposits as amyloid
    3. It arises from c cells surrounding the thyroid
17. Hx of men 2 b or 2 a resect the thyroid. (progresses to medullary thyroid cancer)
18. Neck mass, bx done papillary thyroid cancer
    1. Classic rf Neck / Chest radiation
    2. Histo psammoma bodies
    3. Metastasis via lymphatics
19. Follicular thyroid cancer Mets through blood
20. Many of the thyroid cancers present as cold nodules
    1. Check TSH first (TSH will be high for cold nodule)
    2. Then do an us of thyroid with biopsy
21. Kid + seizures + eeg is chaotic disorganized pattern tuberous sclerosis
    1. AD, subependymal hamartomas
    2. Seizure = west syndrome = classic infantile spasms. Give acth
        1. Or pick vigabatrin (gaba analog)
    3. Assoc w:
        1. Cardiac rhabdomyoma, renal angiomyolipomas (fat + blood vessels + muscle)
        2. Sega brain tumor = subependymal giant cell astrocytoma
    4. Chaotic EEG = hypsarrhythmia
22. Post menopausal female + visual problem/tunnel vision +galactorrhea; or young female with infertility prolactinoma
    1. Tx: bromocriptine or cabergoline (dopamine aka prolactin inhibiting factor)
    2. Do not go straight for transsphenoidal resection most prolactinomas resolve with dopamine
    3. bitemporal heteronymous hemianopsia
23. Pituitary adenoma assoc with men1
24. MC pituitary adenoma = prolactinoma
25. Child + visual field problems + calcified mass on imagine craniopharyngioma
    1. Rathke's pouch (motor oil fluid histo)
26. Lady + weight loss + high fever. One breast is large +tender/edematous inflammatory carcinoma
    1. Infiltrating ductal carcinoma invaded the dermal lymphatics

27. mastitis is unilateral and assoc with recent delivery of baby
    1. MCC= Staph aureus nafcillin or dicloxacillin
28. Eczematoid change of nipple = Pagets of breast
    1. Assoc w/ infiltrating ductal carcinoma
29. 25 yo F + mobile firm lump in breast Fibroadenoma
    1. Can do ultrasound of breast for imaging because they are less than 30
    2. It grows with menstrual cycle, is benign
    3. Do a physical again in a few weeks and see if it has resolved by then
30. Lady at 10 weeks gestation; size >> date. US= hypo echoic structures molar pregnancy
    1. Snow storm appearance; grape like structure
    2. Either complete mole or incomplete mole
        1. Incomplete =Triploid, Contains fetal parts and less likely to progress to choriocarcinoma
        2. Complete mole = diploid; very likely to become choriocarcinoma
    3. Tumor marker = b-hcg
31. Lady w recent hx of molar pregnancy and now has sob. Next step in dx? Chest imaging (xray)
    1. Mc location of chorio met is the lung
    2. Management doc—methotrexate inhibits dihydrofolate reductase but is also a dmard
32. Mother + used a drug in the 80s + now has vaginal cancer DES exposure = Clear cell adenocarcinoma
33. Female + abd fullness and early satiety. Imaging ascites and “omental caking” Ovarian Cancer
    1. Ca-125 tumor marker
34. How Ovarian Cancers can present:
    1. Ovarian cancer + sob + blunting of costophrenic angles on the right - Meigs syndrome
    2. Ovarian cancer + myoclonus, new onset Afib, lid lag, struma ovarii
        1. contains functioning thyroid tissue
    3. Teratomas—contain multiple tissue types
        1. Especially in younger people. Show up in anterior mediastinum
    4. Psammoma bodies on histo serous cystadenocarcinoma
    5. Ovarian mass + histo = tumor cells surrounding blood vessel Endodermal sinus tumor = yolk sac tumor
        1. afp is the tumor marker
        2. Schiller duval bodies
35. Painless mass in testicle ML seminoma
    1. shows up in anterior mediastinum
36. Early satiety + severe epigastric pain, stomach is not moving + ovarian mass histo signet ring cells krukenberg tumor
    1. (gastric carcinoma that has metastasized to ovaries)
37. Pt working in textiles, or prior tx w/ cyclophosphamide. Now has hematuria +weight loss? Next best step? Cystoscopy with biopsy

    1. Bladder cancer
    2. Textiles—exposure to dye (aniline dye)
    3. Cyclophosphamide can cause hemorrhagic cystitis
        1. Break down product =acrolein
        2. Prevent this with mesna, which binds the it
        3. Irrigate the bladder to decrease the amount of contact time with the bladder
    4. Another rf is schistosoma haematobium
        1. Dx: cystoscopy with biopsy
    5. #1RF for bladder cancer smoking
38. Hemorrhagic cystitis is also caused by adenovirus
    1. Adeno causes pharyngoconjunctivitis
39. Cisplatin nephrotoxic
    1. Prevent this with amifostine
40. High Hgb + flank mass + smoker + right sided varicocele RCC (renal cell cancer)
    1. EPO production is its paraneoplastic syndrome
    2. Mets to bone lytic lesions (like lung and thyroid cancer)
    3. R sided varicocele
41. Blastic lesions in bone is caused by prostate and breast
42. 50-60s, jaundice bad weight loss, epigastric pain pancreatic cancer of head
    1. Dx with ct of abdomen
    2. invades sma
    3. To relieve sx (jaundice +itching) ERCP to place a biliary stent
    4. Marker= ca-199
43. LFT anomalies in pancreatic cancer high alk phos, and direct hyperbilirubinemia
44. Colon cancer mets to Liver

CROSS CHECKED? No
Still in progress

Ep. 102: The “Clutch” cancer podcast (Version 2)

- Kid with ataxia + necrotic mass in cerebellum on imaging → pilocytic astrocytoma or medulloblastoma
    - MC brain tumor in kiddos? pilocytic astrocytoma
    - Location? Middle cerebellum/posterior fossa
    - pilocytic astrocytoma
        - Histology? Rosenthal fibers (eosinophilic fibers)
    - Medulloblastoma

        - Histology? Small blue cells
        - Drop mets to spine
- Brain mass with dural tail OR parasagittal mass → meningioma
    - Histology? Psammoma bodies
- Bilateral hearing loss + hx genetic disease → NF-2 w/ bilateral acoustic neuromas
    - Location? Cerebellopontine angle
    - Chromosome? 22
- Cafe-au-lait spots + neurofibromas + optic gliomas → NF-1
- Farmer w/ multiple rough lesions on forehead → actinic keratosis
    - RF? Sun exposure
    - Most likely outcome? resolution
    - Precursor to what? Squamous cell carcinoma
- Characteristics of melanoma
    - A = asymmetric
    - B = irregular borders
    - C = multiple colors
    - D = diameter > 6 mm
    - E = evolution
- #1 prognostic factor = Breslow depth
- Melanoma in usual location? acral lentiginous melanoma
    - Palms/soles or under nails (subungual)
    - Demographic? African American
- “Pearly gray papule” with telangiectasias, above the lip → basal cell skin cancer
- Non-healing ulcer, associated with burn wounds → Marjolin ulcer (squamous cell carcinoma)
- Kid with bone pain + fevers + XR with sunburst pattern → osteosarcoma
    - RF?
        - Retinoblastoma
        - Paget’s disease
        - Teriparatide (PTH analog given in pulsatile manner)
    - Imaging? Codman’s triangle & sunburst pattern
- 2 yo with HTN + flank mass + mass crossing midline w/ calcifications → neuroblastoma
    - Location? Abdomen or posterior mediastinum
    - Histology? Homer-Wright pseudorosettes
    - Oncogene? N-myc
    - Opsoclonus-myoclonus syndrome = weird have movements & weird eye movements
    - Contrast to Wilms tumor: flank mass that does NOT cross midline, NOT calcified
        - Association? WAGR (Wilms tumor, aniridia, GUI anomalies, mental retardation)
- Episodic HA + HTN → pheochromocytoma
    - Derived from? Chromaffin cells of adrenal medulla
        - Have nicotinic ACh receptors (adrenal medulla is modified postganglionic sympathetic neuron)
        - Dx? Urine metanephrines
        - Premedication prior to surgery? Alpha block → beta block → surg
            - Same concept as don’t give beta blocker in cocaine overdose
    - Association?

        - MEN2A: primary hyperparathyroidism (parathyroid hyperplasia) + medullary thyroid cancer + pheo
        - MEN2B: medullary thyroid cancer + pheo + mucosal neuromas + Marfanoid body habitus
        - Von Hippel-Lindau syndrome (VHL)
        - NF-1
- MC cause of hyperparathyroidism overall ? Parathyroid adenoma
- Marfanoid body habitus differential?
    - Marfan's - aortic dissection, lens dislocation upward, MVP, pectus excavatum
        - Gene? Fibrillin
        - Chromosome? 15
        - Inheritance? AD
    - Hyperhomocysteinemia
        - Enzymes? MTHF reductase or CBS deficiency
    - MEN2B

THYROID CANCER

- Medullary thyroid cancer
    - Tumor marker? Calcitonin
    - Stain? Congo red → apple green birefringence due to amyloid (deposits of calcitonin)
    - Derived from? C-cells
    - Association? MEN2A or MEN2B
        - Prevention? Prophylactic thyroidectomy
- Papillary thyroid cancer
    - #1 RF? head/neck/chest radiation
        - E.g. radiation for Hodgkin's lymphoma as teenager
    - Histology? Psammoma bodies
    - Spread? Lymphatic system
- Follicular thyroid cancer
    - Spread? Hematogenous
- Nodule in thyroid with normal/high TSH → hypofunctioning → likely malignant
    - NBS? US + biopsy
- Nodule in thyroid with low TSH → hyperfunctioning → likely non-malignant
    - NBS? RAIU scan
    - RAIU w/ single focus → toxic adenoma
    - RAIU w/ multiple areas of uptake → toxic multinodular goiter
    - RAIU w/ diffuse uptake → Grave's
- Kid <1 year with seizures + EEG with disorganized pattern (hypsarrhythmia) → West syndrome of tuberous sclerosis
    - Tx of West syndrome?
        - 1st: ACTH
        - 2nd: vigabatrin
    - Tumors?
        - Subependymal nodules
        - Cardiac rhabdomyomas
        - Renal angiomyolipomas

        - Subependymal giant cell astrocytomas (SEGA)

- Postmenopausal F with tunnel vision + galactorrhea → prolactinoma
- Reproductive-age F with visual field deficits + infertility → prolactinoma
    - Tx?
        - 1st: Bromocriptine or cabergoline (dopaminergic therapy)
        - Don't go straight to transphenoidal resection
    - Specific vision defect? Bitemporal hemianopsia
- Pituitary adenoma
    - MC type overall? Prolactinoma
    - Association?
        - MEN1 → pituitary adenoma, parathyroid hyperplasia, pancreatic tumors

- Child with vision problems + calcified mass on imaging → craniopharyngioma
    - Derived from? Rathke's pouch
- Woman with weight loss + fevers + enlarged, edematous breast → inflammatory breast cancer
    - Pathophys: invasive ductal carcinoma that has invaded dermal lymphatics
    - Don't confuse with mastitis
        - Bug? Staph aureus (MSSA)
        - Tx? Dicloxacillin or nafcillin
- Woman with eczematoid change of nipple → Paget's disease of breast
    - Pathophys? Underlying DCIS or invasive ductal carcinoma
- 25 yo F with firm, mobile breast lump + variation with menstrual cycles → fibroadenoma
    - Dx? US (pt < 30)
    - Tx? Reassure
- Pregnant lady at 10 wks GA, uterus measuring 20 cm, US with ill-defined mix of hyper- and hypoechoic structures in uterus → hydatidiform mole
    - Imaging? "Snowstorm" appearance on US
    - Gross path? Grape-like cluster
    - Incomplete mole:
        - 2 sperm + egg
        - 69 XXY
        - Some fetal parts
        - Less likely to progress to choriocarcinoma
    - Complete mole:
        - 2 sperm + empty egg
        - 46 XY or XX
        - No fetal parts
        - Higher choriocarcinoma risk
    - Choriocarcinoma marker? beta-hCG
    - Woman with hx of molar pregnancy, now with SOB → choriocarcinoma with mets to lung
        - NBS? CXR
    - Tx of choriocarcinoma? Methotrexate

- Pt whose mom used a morning sickness drug that's now off the market, now presenting with vaginal cancer? DES exposure
    - Cancer type? clear cell adenocarcinoma of vagina
    - MC vaginal cancer? Squamous cell cancer
        - RF? HPV

OVARIAN TUMORS

- 67 yo F with abdominal fullness + early satiety + CTAP w/ ascites and omental caking → ovarian cancer
    - Often advanced stage at diagnosis
    - Tumor marker? CA-125
- Ovarian mass + Psammoma bodies on histology → serous cystadenocarcinoma of the ovary (MC ovarian epithelial tumor, MC ovarian malignancy)
- Ovarian mass + SOB + blunting of costophrenic angles in right → Mieg's syndrome
    - Triad = benign ovarian tumor + ascites + pleural effusion
    - Ascites and pleural effusion resolve with ovarian mass removal
- Ovarian mass + myoclonus + lid lag on exam + A-fib → struma ovarii
    - Pathophys? Teratoma with hyperfunctioning thyroid tissue
- Teratoma locations?
    - Ovaries
    - Anterior mediastinum

- Ovarian mass + tumor cells surrounding a blood vessel? yolk sac tumor = endodermal sinus tumor
    - Histology? Schiller-Duval body
    - Tumor marker? AFP

- Early satiety + severe epigastric pain + stomach is fixed + ovarian mass on imaging + Signet ring cells → Krukenberg tumor
    - Pathophys: gastric cancer that has metastasized to ovaries
    - Gastric adenocarcinoma
        - Intestinal type
        - Diffuse type → infiltrative growth
            - Gross path? Linitis plastica

- 28 yo M with a few months of painless mass in testicle → testicular cancer
    - Will likely be a seminoma on NBMEs

- 70 yo M who worked in textile industry presents with hematuria & weight loss → bladder cancer
    - NBS? Cystoscopy with biopsy
    - RF?
        - Smoking (#1)
        - Aniline dyes (textile industry)
        - Cyclophosphamide exposure
        - Schistosoma haematobium

- Causes of hemorrhagic cystitis?

    - Cyclophosphamide
        - Prevention? Mesna + irrigation
    - Adenovirus (sore throat + conjunctivitis + hematuria)

- Pt with smoking hx + elevated Hgb + R-sided varicocele + hematuria + flank mass → RCC
    - Pathophys of varicocele? Tumor invasion of IVC/gonadal vein
        - R-sided varicocele is more rare & should trigger RCC dx
        - Recall that L varicocele is more common because L gonadal vein drains into L renal vein (more circuitous route)
        - R gonadal vein drains directly to IVC
    - Pathophys of polycythemia?
        - Epo production by RCC
    - Metastasizes where? Bone (lytic lesions)
        - Lytic mets list: RCC, thyroid, lung
        - Blastic mets list: prostate & breast

- 55 yo pt with jaundice + epigastric pain + weight loss → pancreatic cancer (head of pancreas)
    - Dx? CT abdomen
    - Tends to invade what? SMA
    - Contraindication to surgery? Blood vessel invasion
    - Palliative measure for itching/jaundice? ERCP w/ biliary stent
    - Tumor marker? Ca 19-9
    - LFT labs? Cholestatic pattern (high alk phos + high direct bili)

- Hepatocellular carcinoma
    - RF?
        - Cirrhosis
        - Hep B or C
        - Aflatoxins
        - Hereditary hemochromatosis
        - Wilson’s disease
    - Paraneoplastic syndromes?
        - Polycythemia 2/2 epo production
    - Tumor marker? AFP
    - Prevention? Hep B vaccine

- Colon cancer
    - Most likely location of metastasis? Liver
    - Premalignant lesions? Villous adenoma > tubular adenoma
    - Genetic syndromes
        - FAP
            - Inheritance? AD
            - Mutation? APC
            - Prevention? Colectomy by 20
            - If brain mass → Turcot syndrome

            - If soft tissue tumors → Gardner syndrome
        - HNPPC = Lynch Syndrome
    - Adenoma-carcinoma sequence
        - APC → Kras → p53

- Systolic murmur at LLSB + diarrhea + episodes of stridor + RLQ abdominal mass + rash → carcinoid tumor
    - Location? Often appendix
        - If mediastinum, will be posterior mediastinum
    - Dx? Urine 5-HIAA
    - Pathophys of rash? Carcinoid tumors produce serotonin, so this diverts tryptophan from niacin pathways, causing pellagra
        - 4 D's of pellagra: dementia, diarrhea, dermatitis, death
    - Why only R-sided lung lesions? Lungs breakdown carcinoid products
        - "TIPS" → tricuspid insufficiency & pulmonic stenosis
    - Why no sxs until liver mets? Liver breaks down carcinoid products

- Pt with longstanding GERD + mass in distal esophagus → esophageal adenocarcinoma
    - #1 RF = Barrett's esophagus (squamous cells → intestinal epithelium = non-ciliated columnar epithelium with goblet cells)
    - Contrast with RF for squamous cell carcinoma
        - Zenker's diverticulum
        - Achalasia
        - Ingestion
- Pt with dysphagia + weight loss? EGD w/ biopsy
- 52 yo with dysphagia, no other alarm sxs → EGD
    - 50+ is an indication for EGD
    - Progressive dysphagia suggests growing mass

- Longtime smoker with proximal muscle weakness, improves with repetition → LEMS 2/2 small cell lung cancer
    - Pathophys? Ab against presynaptic voltage-gated Ca++ channels, improved with use because there is more recruitment of Ca++
    - EMG? Incremental response to repetitive nerve stimulation
    - Contrast with MG, where weakness worsens with use
    - Small cell paraneoplastic syndrome
        - LEMS
        - ACTH
            - Does NOT suppress with high-dose dex
        - SIADH → euvolemic hyponatremia
            - Tx? Fluid restrict
    - Squamous cell paraneoplastic
        - PTHrP → hypercalcemia
            - Tx? Bisphosphonate for hypercalcemia of malginancy
            - If acutely ill, NBS? Hydrate!

  - Squamous & small cell are CENTRAL
  - Adenocarcinoma is PERIPHERAL
    - Female or non-smoker → consider adenocarcinoma
  - Lung cancer pt + facial fullness → SVC syndrome
    - Pathophys? Not draining H&N veins
  - Unilateral eye drop + constricted pupil → Horner's 2/2 Pancoast tumor
    - Partial Horner's associated with? Cluster HA
      - Tx? 100% O2
  - Joint pain + finger clubbing in smoker → hypertrophic osteoarthropathy (associated with lung cancer)
    - NBS? CXR
    - Electrolyte association? hypoglycemia

- Tumor associated with MG? Thymoma
  - Location? Anterior mediastinum

- Multiple new SKs → sign of Leser-Trelat
  - Associated malignancy? pancreatic/gastric cancer
  - NBS? Abdominal CT
  - If succussion splash on exam? Gastric cancer
    - Pathophys? Gastric outlet obstruction

- Velvety lesions in axillary → acanthosis nigricans
  - MC cause? Insulin resistance (obesity & DM)
  - Associated malignancy? Gastric cancer

- Mesothelioma
  - RF?
    - Asbestos exposure → shipyard worker
  - Smoking does NOT increase risk of mesothelioma
  - Imaging? Pleural thickening on CXR
  - Histology? Psammoma bodies
  - MC asbestos-related malignancy? Bronchogenic carcinoma, NOT mesothelioma

- IVDU/prostitution + purple lesions on skin → Kaposi's sarcoma
  - Associated virus? HHV-8

- Immigrant or African kid with jaw mass → Burkitt's lymphoma
  - Translocation? t(8,14)
  - Gene? C-myc
  - Histology? Starry sky

- Pt with hematologic malignancy, now hypotensive & bleeding from tumor sites → APML
  - Pathophys? Auer rods trigger DIC
  - Translocation? t(15,17)

  - Histology? Auer rods
  - Tx? ATRA

- Kid < 8 yo with weight loss & fevers → ALL
  - Association? Down syndrome

- Old person with pneumonia + WBC 80k → CLL

- Middle age person with fevers + weight loss + early satiety → CML
  - Translocation? t(9,22)
  - Protein? BCR-ABL
  - Tx? Imatinib (tyrosine kinase inhibitor)

- Hodgkin's lymphoma
  - Epi? Bimodal distribution
    - teens-20s
    - 50s-60s
  - Histology? Reed-Sternberg cell
  - Renal association? Minimal change disease
  - MC type? Nodular sclerosing
  - Type with best prognosis? Lymphocyte predominant
  - Future cancer? Papillary thyroid cancer due to chest radiation

- Nephrotic-malignancy associations
  - Hematologic malignancy → minimal change disease
  - Solid malignancy → membranous nephropathy
    - Ab? Phospholipase A2 receptor

- Cervical cancer
  - RF? HPV
  - CIN 1 → CIN 2 → CIN 3
  - MC cause of death? Renal failure 2/2 tumor invasion of ureters
    - Imaging? Hydronephrosis

- Genetic diseases associated with malignancy
  - Peutz Jeghers → hamartoma + hyperpigmented macules on lips + pancreatic ca
  - XP → skin cancer
    - Pathophys? Mutation in DNA repair genes
  - VHL → hemangioblastoma + bilateral RCC + pancreatic cysts/cancer + pheo
    - High Hct 2/2 hemangioblastoma producing Epo
  - Tuberous sclerosis → rhabdomyoma

- Brain tumor that crosses corpus callosum → glioblastoma multiforme
  - Tumor marker? GFAP
  - Imaging? Vasogenic edema with central necrosis

- Autoimmune-associated malignancy
    - Sjogren's → salivary gland lymphoma
    - Celiac → lymphoma of GI tract (EATL)
    - Hashimoto's → thyroid lymphoma

- Post-menopausal pt with vaginal bleeding → endometrial cancer
    - endometrial biopsy
    - MC cause? Atrophic vaginitis
    - SERM that increases risk? Tamoxifen (agonist in uterus)
    - SERM that doesn't increase risk? Raloxifene
- Murmur that changes with weight change + fevers → rhabdomyoma
    - Location? Left atrium

ID-associated malignancy
- H. pylori → MALT lymphoma
    - Stain? Silver strain
    - Tx?
        - Triple therapy = clarithromycin + amox + PPI
        - Quadruple therapy = bismuth + metro + tetracycline + PPI
- Clonorchis sinensis → biliary tract
- Schistosoma haematobium → bladder cancer
- EBV → nasopharyngeal carcinoma & Burkitt's lymphoma
- HPV → cancers of lower reproductive tract
    - Strains? 16, 18, 30s

Ep. 104: ACLS, Arrhythmias, and HY Cardiac Pharm

Episode 104 notes were graciously provided by Divine Intervention from an anonymous contributor.

Code blue!
1. Who is running the code?
2. Identify yourself if running the code
3. Assign tasks to people
    a. Electricity/defib/cardiovert
    b. Recorder
    c. Timer
    d. Pharmacy
    e. Pill-pusher

Patient codes in front of you!
1. Tap the patient: do they respond?
2. Feel for a pulse i.e. carotids

3. Start CPR (30 compressions 120/min:2 breaths)
4. Call for help
5. Try to identify arrythmia on monitor
    a. ***Vfib*** or *pulseless* ***Vtach***
        i. **Defibrillate** = unsynchronized cardioversion 200 joules q2m
            1. Pulse and rhythm check prior to defibrillation
        ii. Epinephrine 1mg
        iii. 2m
        iv. Amiodarone 300mg IV
        v. 2m
        vi. Epinephrine 1mg
        vii. 2m
        viii. Amiodarone 150mg IV
        ix. 2m
        x. Epinephrine 1mg
        xi. 2m
        xii. Amiodarone 150mg IV
        xiii. 2m
        xiv. Lidocaine 1mg/kg
        xv. "every 2 minutes, do 3 things: pulse/rhythm check + shock + drug"
    b. No pulse = ***pulseless electrical activity*** or flat-line = ***asystole***
        i. Epinephrine 1mg q4m
            1. "all roads lead to epi"
        ii. Continue CPR 30:2
        iii. DDx
            1. 5Ts: tension pneumo, thromboses, toxins, trauma, tamponade
            2. 5Hs: hypo/hyperkalemia, hypothermia, hypoglycemia, H+/acidosis, hypovolemia

- Wide-complex tachyarrythmia: assume in ***Vtach***
    1. Pulse?
        i. No: ACLS algorithm ^^^
        ii. Yes: stable or unstable (hypotensive, altered, symptomatic)?
            1. Stable: **amiodarone**
            2. Unstable: **synchronized/direct current/direct current countershock cardioversion** 100 joules
                a. You don't want to defibrillate them while they're repolarizing
- Narrow-complex tachyarrythmia: assume in ***SVT***
    1. Vagal maneuvers, cold water, massage carotids
    2. Adenosine 6 --> 12 --> 12mg; ~trying to slow their heart down~
    3. IV beta blocker or CCB (non-dihydro: verapamil, diltiazem)
    4. Synchronized cardioversion
- ***Afib*** (irregularly irregular w/o p-waves)
    1. Stable?
        i. Yes
            1. Rate control: beta blocker, non-dihydro CCB
            2. Rhythm control: amiodarone (class III anti-arrhythmic)
        ii. No
            1. Synchronized cardioversion!
- ***Atrial flutter*** (sawtooth)
    1. Stable?
        i. Yes
            1. Rate control: beta blocker, non-dihydro CCB

            2. Rhythm control: amiodarone (class III anti-arrythmic)
        ii. No
            1. Synchronized cardioversion!
- ***Wolf-Parkinson-White*** (delta wave + short PR interval)
    - Do not block AV node (then they'll keep running through bundle of kent!)
        - Give **Procainamide**
- ***Multifocal atrial tachycardia*** (3+ p-wave morphologies)
    - Treat underlying disorder
    - BB, CCB, stop smoking
- ***Bradyarrythmia*** (HR in 30s)
    - **Atropine** (muscarinic antagonist --> speed up conduction through AV node)
    - Pacing
- Drugs
    - Anti-arrhythmics
        - Sodium channel blockers, prolong QRS
            - Class IA
                - Disopyramide
                - Quinidine
                - Procainamide
                    - Ae: drug-induced lupus
                - ~phenytoin~
            - Class 1B
                - **Lidocaine**
                - **Mexiletine**
                - **Tocainide**
            - Class IC
                - **Flecainide**
                - **Propafenone**
        - Class II beta blockers
            - **Metoprolol**
            - **Labetalol**
        - Class III
            - **Amiodarone**: K+ channel blocker
            - Ae: hypotension, hypo/hyperthyroidism (Wolf-Chaikoff), blue discoloration of skin, pulmonary fibrosis (decreased DLCO)
        - Class IV non-dihydro CCB; slow conduction through AV node; @phase4
            - **Verapamil**
            - **Diltiazem**
        - **Digoxin** = positive inotrope, musc agonist
            - --| Na/K ATPase pump --> increased intracellular Na --| Na/Ca exchanger --> increased Ca --> strength of contraction
            - Does not improve survival!
            - Ae: digoxin-toxicity (esp when hypokalemic), hyperkalemia (e.g. on diuretic)
                - Tx: anti-dig Fab fragment
- Beta blockers
    - Do not give in cocaine overdose (instead give phentolamine, carvedilol/labetalol)
    - Improve survival in heart failure: metoprolol, bisoprolol, carvedilol
        - In addition to:
            - **Spironolactone** --| aldosterone receptor
                - Also for PCOS, liver disease

            - Ae: gynecomastia
        - **BiDil** = hydralazine + isosorbide
        - ACEi
            - c/I bilateral renal artery stenosis
            - Esp useful for diabetics!
                - --| ATII preferential constriction of efferent arteriole and intraglomerular filtration injury
            - --| CCB side effects:
                - peripheral edema (dilation of pre-capillary arterioles --> increased hydrostatic pressure)
                    - ACEi dilate post-capillary venules --| peripheral edema
                - Reflex tachy
- **Nitroprusside** --| hypertensive emergency
    - Ae: cyanide toxicity
- **Hydralazine**: vasodilator
    - Ae: drug-induced lupus, tachycardia
- Cardiogenic shock?
    1. **Dobutamine** = beta1 agonist --> HR, stroke volume
    2. **Milrinone** = inodilator/PDE inhibitor --> increase **cAMP** (@cardiac muscle: contraction; @smooth muscle: blood vessels relaxation and decreased SVR)
        i. !!! So cool

Ep. 111: The "Clutch" Pharmacology Podcast Round 1

- Nitrates
    - Indication? angina
    - AE?
        - HA (due to vasodilation)
- Statins
    - Mechanism? Inhibit HMG CoA-reductase
    - AE?
        - Hepatotoxic
        - Myotoxic
    - Interactions?
        - Fibrates
- Niacin
    - Raises HDL the best
- Cholestyramine
    - Mechanism? Prevent bile acid reabsorption
- Fibrates
    - Lower TGs
    - AE?
        - Hepatotoxic
        - Myotoxic
- Digoxin

  - Mechanism? Inhibits Na/K-ATPase so acts as positive inotrope + muscarinic agonist activity
  - Indications?
    - Afib
    - CHF - doesn’t improve survival
  - AE?
    - Hyperkalemia
  - What prediposes to digoxin toxicity? Hypokalemia
  - Sign of dig toxicity? PVCs, vision problems, abdominal pain
- Procainamide
  - Class Ia antiarrhythmic
  - Indication? WPW
  - AE? Drug-induced lupus
- Amiodarone
  - Class III antiarrhythmic
  - Mechanism? K+ channel blocker
  - AE?
    - Hypothyroidism/hyperthyroidism
    - Skin discoloration
    - Pulmonary fibrosis
- Beta blockers
  - A-M → selective
  - N-Z → nonselective
    - Contraindication? Asthma
  - Indications?
    - Performance anxiety
    - Afib
- Nondihydropyridine CCBs (e.g. verapamil, diltiazem)
  - Mechanism? Negative inotropes + slow conduction through AV node
  - Indication?
    - Afib
    - Prinzmetal angina
- CCB indicated for pt with recent SAH? Nimodipine
  - Prevents post-SAH vasospasm and resultant ischemic stroke
- DIhydropyridine CCBs
  - AE? Peripheral edema (dilation of precapillary arterioles → increase hydrostatic pressure in capillaries)
    - How to decrease this? Dilate post-cap venules with ACE-I
- Nitroprusside
  - Indication? Hypertensive emergency
  - AE? Cyanide poisoning
- Bisphosphonates
  - Indication?
    - Osteoporosis
    - Hypercalcemia of malignancy
  - AE?

        - Pill esophagitis (drink water, be upright for 30 mins after taking)
        - Osteonecrosis of jaw
- Teriparatide
    - Mechanism? PTH analog
        - Continuous PTH → suppressed bone production
        - Pulsatile PTH → increases bone formation
    - AE?
        - Increased risk of osteosarcoma
- Uses of Mg
    - Prevent seizures in pt with pre-eclampsia
    - Severe asthma attack
- Dopamine agonist (e.g. bromocriptine/cabergoline)
    - Mechanism? Dopamine inhibits the release of prolactin (via tuberoinfundibular pathway)
    - Indication? prolactinoma
- Typical antipsychotics?
    - High-potency: Haloperidol, fluphenazine, trifluoperazine
    - Low-potency: chlorpromazine, thioridazine
    - AE?
        - QT prolongation
        - Hyperprolactinemia
            - Dopamine = “prolactin-inhibiting factor”
        - EPS
            - Acute dystonia
                - Tx? Benztropine, diphenhydramine
            - Akinesthesia
                - Tx? Beta blocker
            - Parkinsonian
            - Tardive dyskinesia
- Metoclopramide
    - Mechanism? Dopamine antagonist
    - Indication? Diabetic gastroparesis
    - AE?
        - EPS (e.g. drug-induced parkinsonism)
- Atypical antipsychotics
    - Risperidone → hyperprolactinemia
    - Ziprasidone → QT prolongation
    - Quetiapine → cataracts
        - Special indication? Psychosis in the s/o of treatment for Parkinson’s
    - Olanzapine → metabolic syndrome
        - Indication aside from schizophrenia? OCD
            - O = olanzapine
            - C = clomipramine
            - D = antidepressants (SSRIs)
    - Clozapine → agranulocytosis, myocarditis
        - Decreases risk of suicide

    - Aripiprazole → partial dopamine receptor agonist
- Tricyclic antidepressants
    - AE? anti-HAM
        - Anti-histamine → sedation
        - Anti-alpha-1 → orthostatic hypotension
        - Antimuscarinic → urinary retention, constipation
    - Tx for toxicity? Sodium bicarb
    - Special indications?
        - OCD (clomipramine)
        - Nocturnal enuresis (imipramine)
            - Other tx options? Desmopressin = ADH analog
- MAO-Is
    - Isocarboxazid, phenelzine, tranylcypromine
    - MAO-B inhibitors: rasagiline, selegiline
        - Indication? Parkinson's
    - AE? Hypertensive crisis with tyramine consumption
- Serotonin syndrome
    - Presentation? High fevers + myoclonus
    - NBS? Supportive care + benzos
    - If not responding? cyproheptadine (anti-histamine with serotonin receptor-blocking activity)

- SSRIs
    - Indications?
        - 1st line for depression
        - 1st line for GAD
        - 1st line for PSTD
    - AE?
        - Sexual dysfunction
        - Weight gain
- SNRIs (venlafaxine, duloxetine)
    - Indications? Neuropathic pain
    - AE? HTN
- NDRIs (bupropion)
    - Benefits? No seuxal side effects, no weight gain, helps with smoking cessation
    - Contraindications? Anorexia & bulemia
        - Why? Lowers seizure threshold
- Lithium
    - Decreases risk of suicide
    - AE?
        - Hypothyroidism
        - Nephrogenic DI
        - Tremors - sign of toxicity
- -Vaptans (e.g. conivaptan, tolvaptan)
    - Mechanism? ADH receptor antagonists
    - Indications? SIADH

- Darbepoetin
    - Mechanism? EPO analog
    - Indications? Anemia associated with CKD
- Cinacalcet
    - Mechanism? CSR modulator → decreased PTH release
    - Indications?
- Loop diuretics
    - Site of action? Na-K-2Cl transporter in the thick ascending limb of the loop of Henle
    - AE?
        - Hypokalemia
        - Hypocalcemia & hypercalciuria
        - Hypomagnesemia
    - Contraindication? Hx nephrolithiasis
- Thiazide diuretics
    - Site of action? Na-Cl symporter in the DCT
    - Strongest association with
    - AE? hyper-GLUC
        - Hyperglycemia
        - Hyperlipidemia
        - Hyperuricemia
        - Hypercalcemia
- Potassium-sparing diuretics
    - ENaC blockers (amiloride, triamterene)
        - Special indication? Nephrogenic DI associated with lithium
    - Aldosterone antagonists
        - Spironolactone
            - AE? Gynecomastia (also blocks androgen receptors)
            - Indications?
                - Conn's syndrome
                - Hirsutism of PCOS (inhibits 5-alpha reductase in the skin)
                - Improves survival in HF
        - Eplerenone
    - Type of RTA? 4
- Drugs that improve survival in HF
    - ACE-I
    - Beta blockers: bisoprolol, carvedilol (alpha-beta blocker), ER metoprolol
    - Spironolactone
    - Isosorbide dinitrate-hydralazine in African Americans
- Acetazolamide
    - Mechanism? Carbonic anhydrase inhibitor
    - Electrolyte effects? Hypokalemia + metabolic acidosis
    - Indications?
        - Central sleep apnea (metabolic acidosis → compensatory resp alkalosis → hyperventilation → increases respiratory drive)
        - Idiopathic intracranial HTN

        - Glaucoma
        - Altitude sickness
    - Type of RTA? 2
- Mannitol
    - Mechanism? Non-reabsorbable sugar
    - Indications?
        - Elevated ICP
        - Diuretic
- Ethosuxamide
    - Mechanism? T-type CCB
    - Indications? Absence seizures
- Carbamazepine
    - Indications?
        - Seizures (narrow spectrum)
        - Trigeminal neuralgia
    - AE? Agranulocytosis
- Phenytoin
    - AE?
        - NTD in fetus
        - Drug-induced lupus
- Valproic acid
    - AE?
        - Most teratogenic antiepileptic
        - Hepatotoxic
- Hyperthyroidism drugs
    - PTU
        - Better in pregnancy (1st trimester)
        - Can inhibit peripheral T4 → T3 conversion
        - Useful in the tx of thyroid storm
    - Methimazole
    - AE? Agranulocytosis
- Tx of thyroid storm
    - 1st: propranolol
    - 2nd: PTU
    - Then steroids, Lugol’s solution, etc.
- Abx that cover MRSA
    - Vancomycin
        - AE?
            - Red man syndrome
                - Tx? Slow infusion, give antihistamine or NSAID before infusion
            - Nephrotoxic
            - Ototoxic
    - Daptomycin
        - Where can’t it be used? Lungs (inhibited by surfactant)
          AE? Myotoxicity

    - Linezolid
        - Mechanism? 50S inhibitor
        - AE? Serotonin syndrome
    - Rifampin
        - AE? Orange bodily fluids
    - Tigecycline

- Abx that cover Pseudomonas
    - Ceftazidime (only 3rd gen that covers)
    - Cefepime (4th gen)
    - Aztreonam
        - Little cross-reactivity with other penicillins
    - Aminoglycosides
        - AE?
            - Nephrotoxicity → ATN
            - Ototoxicity
    - FQ
        - AE?
            - QT prolongation
            - Achilles' tendon rupture
        - Contraindications?
            - Pregnancy
            - Children
    - Pip-tazo
    - Colistin/polymyxin E
        - Last-resort for serious GNR infections
        - VERY nephrotoxic

- TMP-SMX
    - Mechanism:
        - TMP → inhibits dihydrofolate reductase
        - SMX → inhibits dihydropteroate synthetase
    - Tx for resultant bone marrow suppression? Leucovorin
    - Ppx for PCP with CD4 < 200
    - Ppx for toxo with CD4 < 100
- Pyrimethamine-sulfadiazine
    - Pyrimethamine → inhibits dihydrofolate reductase
    - -Sulfadiazine → inhibits dihydropteroate synthetase
    - Indications? Tx of toxo
- Macrolides
    - Indications?
        - Diabetic gastroparesis (macrolides are motilin receptor agonists)
        - Atypical pneumonia
            - Mycoplasma
            - Chlamydia

            - Legionella
        - Triple therapy for H. pylori (azithromycin)
        - Ppx against MAC in AIDS pt with CD4 < 50 (azithromycin)
        - Pertussis tx & ppx for close contacts
    - AE?
        - Diarrhea
        - QT prolongation
        - Erythromycin → pyloric stenosis in NB
- Ceftriaxone (3rd gen cephalosporin)
    - Indications?
        - Meningitis
        - Ppx of close contacts of pts with meningitis
            - Rifampin is the preferred agent
    - AE?
        - Intrahepatic cholestasis in neonates
            - Use cefotaxime ("baby ceftriaxone")
- Penicillins
    - Indications?
        - Syphilis
            - Jarisch-Herxheimer reaction
- Aminopenicillins (e.g. PO amoxicillin, IV ampicillin)
    - Indications?
        - Ampicillin for Listeria infection
            - #3 cause of serious infections in the neonate
- Acyclovir
    - Indications?
        - Herpes
        - ZVZ
    - AE? Crystalline nephropathy
    - If resistant give what? Foscarnet
- Ganciclovir
    - Indication? CMV
    - Mechanism of mutation? UL97 kinase mutation
    - If resistant give what? Foscarnet
- Alpha-1 receptor blockers
    - Phenoxybenzamine (irreversible)
    - Phentolamine (reversible)
    - Indications?
        - Pheo (alpha block before beta block)
- Alpha-beta blockers
    - Carvedilol
    - Labetalol
- Alpha-1 agonist
    - Phenylephrine
        - Indications?

      - Allergic rhinitis
      - Hypotension
    - AE? Nasal septum perforation
- Alpha-2 agonists (e.g. clonidine, guanfacine)
  - Indications?
    - Opioid withdrawal
    - Resistant HTN
    - Tourette’s
    - ADHD
- Beta blockers
  - Indications?
    - Improve survival in HF (bisoprolol, carvedilol, metoprolol)
    - Thyroid storm (propranolol)
    - Glaucoma (timolol)
    - Performance anxiety
  - Contraindications? Cocaine intoxication (unopposed alpha → profound HTN)
  - Tx for toxicity? Glucagon
  - RAAS response? Decreased (beta-1 receptors on afferent arteriole)
- PPIs
  - Mechanism? Irreversible inhibit Na-H antiporter on parietal cells → decrease acid in lumen of stomach
  - Indications?
    - GERD
    - Barrett’s esophagus
    - Triple/quad therapy in H. pylori
      - Hold PPI before testing to avoid false neg
  - AE?
    - CYP inhibition
    - Osteoporosis
    - Aspiration pneumonia
- H2 receptor antagonists (e.g. cimetidine)
  - Indications?
    - GERD
    - PUD
  - AE?
    - CYP inhibition
    - Gynecomastia (cimetidine)
- GnRH analogs (e.g. leuprolide)
  - Indication?
    - Shrink fibroid prior to surgery
    - Fertility tx (pulsatile)
    - Metastatic testicular cancer (continuous)
    - Metastatic prostate cancer (continuous)
      - Alternatives? Androgen-receptor blockers (e.g. flutamide, bicalutamide)
- Taxofimen

    - Mechanism? SERM
        - Antagonist in breast
        - Agonist in bone & uterus
    - AE? Increased risk of endometrial cancer
- Raloxifene
    - Mechanism? SERM
        - Antagonist in breast
        - Agonist in bone
        - Doesn't act in uterus
- Pegvisomant
    - Mechanism? Growth hormone receptor antagonist
    - Indications?
        - Acromegaly
- Dexamethasone → glucocorticoid
- Hydrocortisone → glucocorticoid & mineralocorticoid
- Fludracortisone → mineralocorticoid
- PDE inhibitors (e.g. sildenafil, tadalafil)
    - Indications?
        - Erectile dysfunction
        - Pulmonary arterial HTN
    - Contraindications?
        - Pts on other vasodilators
- Aspirin
    - Mechanism? Irreversible inhibitor of COX-1 and COX-2
    - Indications?
        - Chest pain 1st drug
    - AE?
        - PUD
            - Prevention? Misoprostol (prostaglandin)
- P2Y12 receptor blockers (e.g. clopidogrel, prasugrel, ticagrelor)
    - Indications?
        - Post-stroke
        - Post-MI
- Dipyridamole
    - Mechanism? Increases cAMP → relaxes SM & increased cardiac contractility
    - Indications?
        - Stress test (uses coronary steal principle)
- Cilostazol
    - Mechanism? Increases cAMP → relaxes SM
    - Indications?
        - Symptomatic relief of PAD
- GpIIbIIIa receptor antagonists (e.g. abciximab, tirofiban, eptifibatide)
    - Mechanism? Prevents platelet aggregation
- Heparin
    - Mechanism? Activates AT-III

    - Reversal agent? Protamine sulfate (for unfractionated heparin)
    - AE? HIT = heparin-induced thrombocytopenia
        - NBS? Give direct thrombin inhibitor (e.g. dabigatran, argatroban, bivalirudin)
            - Reversal of dabigatran? Idarucizumab
- Factor X inhibitors (e.g. apixaban, rivaroxaban)
- Warfarin
    - Mechanism? Inhibitors VKOR → decreases gamma-carboxylation of factors 2,7, 9, 10, protein C & S
    - Bridge with heparin (avoid transient hypercoagulability)
    - Reversal agents?
        - Vit K
        - Four-factor PCC
- Nitrofurantoin
    - Indication? Cystitis in females
    - AE? Pulmonary fibrosis
- Drugs associated with pulmonary fibrosis
    - Busulfan
    - Bleomycin (G2 phase)
    - Amiodarone
    - Methotrexate
        - Mechanism? Dihydrofolate reductase inhibitor
        - Rescue agent? Leucovorin
        - AE? Hepatotoxic
        - Indications?
            - Autoimmune dz (e.g. RA)
            - Choriocarcinoma
            - Ectopic pregnancy
- Cyclophosphamide
    - Mechanism? Alkylating agent
    - AE?
        - Hemorrhagic cystitis
            - Prevention? mesna
        - Bladder cancer
- Cisplatin
    - AE?
        - Ototoxicity
        - Nephrotoxic (causes ATN)
            - Prevention? Amifostine
- Vinc alkaloids (e.g. vincristine, vinblastine)
    - Mechanism? Prevent polymerization of microtubes
    - AE? Peripheral neuropathy
- Taxanes
    - Mechanism? Prevent depolymerization of microtubules
- TNF inhibitors (e.g. adalimumab, etanercept)
    - Check for latent TB before starting

- ATRA
    - Indication? APML
        - t(15,17)
        - DIC risk
- Imatinib
    - Indication? CML
        - t(9,22)
        - BCR-ABL fusion protein
- Eculizumab
    - Mechanism? Monoclonal Ab against C5
    - Indication? PNH
    - Vaccine against? Neisseria meningitidis
- Adenosine
    - Indication?
        - Break SVT
        - Regadenoson for cardiac stress tests
    - What antagonizes its effects?
        - Caffeine
        - Theophylline
- Octreotide
    - Indication?
        - Variceal bleed
            - Give spironolactone + propranolol to reduce recurrence risk
- Insulin
    - Ultra rapid-acting: lispro, aspart, glulisine
    - Rapid-acting: regular
    - Intermediate-acting: NPH
    - Long-acting: detemir & glargine
- Metformin
    - Weight neutral
    - Stop metformin before getting contrast. If contrast causes renal injury, they can have a life-threatening lactic acidosis
- Sulfonylureas
    - Mechanism? K+ channel blockers. Close ATP-dependent K+ channel which leads to insulin release
    - Weight gain (2/2 increased insulin release)
    - 2nd gen: glyburide, glipizide, glimepiride
- PPAR-gamma activation (e.g. pioglitazone, rosiglitazone)
    - Contraindication? CHF
    - Weight gain
- Alpha-glucosidase inhibitors (e.g. acarbose, miglitol)
    - AE? Diarrhea
- GLP-1 analogs (e.g. exenatide, liraglutide)
    - Contraindication? MTC
    - AE? Pancreatitis

    - Which can be prescribed as a weight loss drug? liraglutide
- DDP4-inhibitors (e.g. sitagliptin)
    - Contraindication? MTC
- SGLT-2 inhibitors (e.g. canagliflozin, dapagliflozin)
    - Contraindication? Renal failure
    - AE? UTIs

Ep. 112: The "Clutch" Pharmacology Podcast Round 2

- Alpha-1 agonists (e.g. phenylephrine, ephedrine)
    - Indication? Hypotension in the s/o anesthesia
- Alpha-1 antagonists
    - Phenoxybenzamine → irreversible
    - Phentolamine → reversible
    - Indication? pheo
- Other alpha-1 antagonists
    - Prazosin, doxazosin
        - Indication? Short-term tx of BPH
            - Long-term BPH tx? 5-alpha-reductase inhibitors (e.g. finasteride)
        - AE? Orthostatic hypotension
    - Tamsulosin (selective alpha-1a blocker)
        - NO orthostatic hypotension
- Alpha-methyldopa
    - Indication? HTN in pregnancy
        - Other meds for HTN In pregnancy
            - Hydralazine
                - AE? Reflex tachycardia & drug-induced lupus
            - Labetalol
            - Nifedipine
    - AE? Drug-induced lupus
- Thyroid storm
    - 1st: propranolol
    - 2nd: PTU
        - AE? Agranulocytosis
- Beta-2 agonists
    - SABA → albuterol
        - Indications:
            - Asthma
            - Hyperkalemia
    - LABA → salmeterol, formoterol
        - Never use LABA before ICS in asthma!
    - Terbutaline/ritodrine

        - Indication? Tocolytics
- Asthma ladder
    - SABA
    - low-dose ICS
    - LABA or medium-dose ICS or leukotriene inhibitor
    - PO steroids
- Epinephrine
    - Indication?
        - Anaphylaxis
        - ACLS
- Norepinephrine
    - Indication? Septic shock
- Inotropes
    - Indication? Cardiogenic shock
    - Dobutamine (beta-1 agonist)
    - Milrinone (PDE inhibitor)
- Muscarinic agonists
    - Bethanechol/carbachol
        - Indications?
            - Overflow incontinence
            - Ogilvie syndrome aka acute colonic pseudo-obstruction
    - Pilocarpine
        - Indication?
            - Glaucoma
            - Sjogren’s
- Acetylcholinesterase inhibitors
    - Edrophonium
        - Very short acting
        - Indication? Diagnostic testing for MG (“Tensilon test”)
    - Neostigmine
        - Indication? Ileus
    - Pyridostigmine
        - Indication? MG
    - Physostigmine
        - Indication? Atropine overdose
        - Mechanism? ACh levels rise and can outcompete atropine (muscarinic antagonist)
    - Donepezil, galantamine, rivastigmine
        - Indication? Alzheimer’s
- Organophosphates
    - Mechanism? irreversible AChE inhibitors → cholinergic toxidrome
    - Sweating, diarrhea, miosis, bradycardia
    - Tx?
        - Atropine
        - Pralidoxime (regenerates ACh)
- Methacholine

    - Mechanism? Muscarinic receptor agonist → triggers bronchospasm
    - Indication? Provocative testing for asthma
- Scopolamine
    - Mechanism? Anticholinergic
    - Indication? Motion sickness
- Tx of urge incontinence/“overactive bladder”?
    - Muscarinic antagonists
        - “On The Darn Toilet”
            - Oxybutynin, Trospium, Darifenacin/solifenacin, Tolterodine
- Ipratropium/tiotropium
    - Mechanism? Muscarinic antagonist
    - Ipratropium → short-acting
    - Tiotropium → long-acting
    - Indication? COPD
        - SABA vs SAMA → choose SAMA
- Midodrine
    - Mechanism? Alpha-1 agonist → vasoconstrictor
    - Indication? Orthostatic hypotension
- Haloperidol (high-potency typical antipsychotic)
    - AE?
        - QT prolongation
        - Hyperprolactinemia
        - EPS
        - NMS
- Isoniazid
    - Indication? TB tx
    - AE?
        - B6 depletion
            - Sideroblastic anemia (cofactor for ALAS)
            - Seizures (cofactor for glutamate decarboxylase)
        - Drug-induced lupus
        - Hepatotoxic
- Levodopa/carbidopa
    - Levodopa = dopamine precursor
    - Carbidopa = dopa decarboxylase inhibitor, prevents peripheral breakdown of levodopa
    - Indication? Parkinson’s
- Entacapone/tolcapone
    - Mechanism? COMT inhibitors → prevent breakdown of dopamine
    - Indication? Parkinson’s
- Selegiline/rasagiline
    - Mechanism? MOA-B inhibitors
    - Indication? Parkinson’s
    - AE? Tyramine hypertensive crisis
- Amantadine
    - Indication? Parkinson’s

- Pramipexole/ropinirole
    - Mechanism? Dopamine receptor agonists
    - Indication?
        - Restless leg syndrome
            - Associated with IDA
            - Other option? Primidone (barbiturate)
        - Parkinson's
- Bromocriptine/cabergoline
    - Mechanism? Dopamine agonists
    - Indication? Prolactinoma
        - Choose medical tx before transphenoidal resection
- Halothane
    - Inhaled anesthetic
    - AE? Malignant hyperthermiaf
        - Tx? Dantrolene (CCB)
- Succinylcholine
    - Mechanism? Depolarizing neuromuscular blocker
    - AE? Malignant hyperthermia
        - Tx? Dantrolene (CCB)
- Cyproheptadine
    - Mechanism? Anti-histamine w/ serotonin receptor block activity
    - Indication? Serotonin syndrome
        - Try benzo first
- Benztropine/trihexyphenidyl
    - Mechanism? Muscarinic receptor antagonists
    - Indication? EPS (e.g. acute dystonia, parkinsonism)
- Memantine
    - Mechanism? NMDA receptor antagonist (combats glutamate excitotoxicity)
    - Indication? ALS
- Ketamine
    - Dissociative anesthetic, NMDA receptor blocking acting
- Riluzole
    - Mechanism? NMDA receptor antagonist (combats glutamate excitotoxicity)
    - Indication? ALS
- Ethosuximide
    - Mechanism? T-type CCB
    - Indication? Absence seizures
- Phenytoin
    - AE?
        - Teratogen
            - But if woman is already pregnant & well-controlled, continue it
        - Drug-induced lupus
- Carbamazepine
    - Indication? Trigeminal neuralgia
    - AE?

        - Teratogen
        - Agranulocytosis
- Valproic acid
    - Teratogen (causes NTD)
    - Hepatotoxic
- Topiramate
    - AE?
        - Mental dullness
        - Nephrolithiasis
    - Indications
        - Epilepsy
        - Migraines
- Lamotrigine
    - AE? SJS
- Benzodiazepines
    - Mechanism? Increase frequency of GABA receptor (Cl- channel) opening
    - Indication?
        - Cocaine intoxication
        - Seizures
    - Benzos okay for liver dysfunction? LOT
        - L = lorazepam
        - O = oxazepam
        - T = temazepam
    - Benzo for alcohol withdrawal? Chlordiazepoxide (very long-acting)
    - Reversal agent? Flumazenil
- Barbiturates
    - Mechanism? Increase duration of GABA receptor (Cl- channel) opening
- Gabapentin
    - Dose adjust in renal disease
    - Indication? Neuropathic pain
- Propofol
    - Indications?
        - Induction & maintenance anesthesia
        - Sedation of mechanically ventilated pts
        - Procedural sedation
    - AE?
        - Respiratory depression
        - Hypotension
        - Propofol infusion syndrome = bradycardia + lactic acidosis
    - Contraindications? Familial hypertriglyceridemia
        - Propofil is suspended in lipid
- Baclofen
    - Indication? Spasticity (e.g in cerebral palsy pt)
- Naloxone
    - Indication? Opioid overdose

- Naltrexone
    - Indication? Alcohol or opioid dependence
- Triptans
    - Mechanism? Serotonin receptor agonists
    - Indication? Acute tx of migraines
    - Contraindications? Vasospastic disease
        - Prinzmetal angina
        - Raynaud’s
    - AE? Serotonin syndrome
- Tx of cluster HA → 100% O2
- tPA
    - Reversal agent? Aminocaproic acid
- Drug to give after SAH? Nimodipine
    - Mechanism? Prevents post-SAH vasospasm
- VEGF inhibitors (e.g. bevacizumab)
    - Indication? Wet age-related macular degeneration
- Latanoprost
    - Mechanism? Prostaglandin analogs
    - Indication? Glaucoma
- Acetazolamide
    - Mechanism? Carbonic anhydrase inhibitor
    - Indications?
        - Central sleep apnea
        - Idiopathic intracranial hypertension
        - Elevated ICP
        - Glaucoma
        - Diuretic → metabolic acidosis + hypokalemia
- Endogenous opioids
    - Beta-endorphin → mu
    - Dynorphin → kappa
    - Enkephalin → delta
- MAO-Is (isocarboxazid, phenelzine, tranylcypromine)
    - 2 week taper when switching from SSRI to MAO-I
    - AE? Tyramine hypertensive crisis
- TCAs
    - anti-HAM side effects
        - Sedation
        - Orthostatic hypotension
        - Urinary retention
    - Imipramine
        - Indication? Nocturnal enuresis
    - Clomipramine
        - Indication? OCD
- SSRIs
    - Which has the longest half-life? Fluoxetine

        - Least associated with SSRI discontinuation syndrome
- SNRIs (e.g. venlafaxine, duloxetine)
    - Which used to treat neuropathic pain? duloxetine
    - AE? hypertension
- Trazodone
    - AE?
        - Priapism (due to alpha-1 blockade)
            - Tx? Phenylephrine injection into penis
- Mirtazapine
    - Mechanism? Alpha-2 antagonist → ultimately increases release of norepi
    - Indication? Depression in pts with anorexia or insomnia
    - AE?
        - Weight gain
        - Sedation
- Bupropion
    - Mechanism? NDRI
    - Indication?
        - Smoking cessation
        - Depression
        - Weight loss
    - AE? Lowers seizure threshold
    - Contraindication?
        - Anorexia/bulimia
- Clozapine
    - Reduces risk of suicide
    - AE?
        - hypersalivation
        - Myocarditis
        - Agranulocytosis
            - STOP drug if their white count falls
- Atypical antipsychotics
    - Risperidone → hyperprolactinemia
    - ZIprasidone → QT prolongation
    - Quetiapine → cataracts
        - Special indication? Psychosis in s/o Parkinson’s
    - Olanzapine → metabolic syndrome
    - Aripiprazole → partial dopamine agonist
- Lithium
    - Sign of toxicity? tremors
    - AE?
        - Tremors
        - Nephrogenic DI
        - Hypothyroidism
- Z-drugs (e.g. zolpidem, zaleplon, eszopiclone)
    - Mechanism? GABA agonist

    - Indication? Insomnia
    - AE? Addictive potential
    - Reversal agent? Flumazenil
- Ramelteon
    - Mechanism? Melatonin receptor agonist
    - Indication? Insomnia
    - NO addictive potential
- Suvorexant
    - Mechanism? Orexin antagonist
        - Recall that pts with narcolepsy have low CSF orexin
    - Indication? Insomnia
- Buspirone
    - Mechanism? Partial agonist at serotonin receptors
    - Indication? Anxiety
- Drugs of abuse
    - PCP → very agitated
    - LSD → flashbacks
    - Marjuana → hunger + conjunctival injection
- If a pt is getting an adenosine-based stress test, caffeine or theophylline (methylxanthines) will reverse the effects of adenosine
- Varenicline
    - Mechanism? Nicotinic receptor partial agonist
    - Indication? Smoking cessation
- Methylphenidate
    - Mechanism? Stimulant
    - Indication? ADHD
    - AE?
        - Insomnia
        - Weight loss
- Atomoxetine
    - Non-stimulant
    - Indication/ ADHD
- Tx for alcohol withdrawal? Benzos
- Aspirin
    - Mechanism? Irreversible inhibitor of COX-1 and COX-2
    - Indications?
        - MI
        - Post-stent
        - Stroke
    - Signs of toxicity? Respiratory alkalosis + metabolic acidosis
- Roflumilast
    - Mechanism? PDE-4 inhibitor
    - Severe COPD
- Sildenafil
    - Mechanism? PDE-5 inhibitor

    - Indication?
        - Pulmonary arterial hypertension
        - Erectile dysfxn
- Desmopressin
    - Mechanism?
        - Increases release of wVF from Weibel-Palade bodies
        - ADH analog → water reabsorption in the collecting duct
        - **Note**: Desmopressin = ADH analog → so, it can cause AE of hyponatremia 2/2 SIADH
    - Indication?
        - Von Willebrand disease
        - Central DI
        - Nocturnal enuresis
            - Caution: it can cause hyponatremia → seizures
- Heparin
    - Mechanism? Activates AT-III to inhibit factors X and II
    - Indication? Anticoagulant
    - AE? HIT
    - Reversal? Protamine
- LMWH
    - Mechanism? Activates AT-III to inhibit factors X
    - Indication? Anticoagulant
- Factor X inhibitors (e.g. rivaroxaban, apixaban)
- Direct thrombin inhibitors (e.g. dabigatran, argatroban, bivalirudin)
    - Indication? HIT
    - Reversal? For dabigatran → idarucizumab
- Warfarin
    - Reversal? Four-factor PCC (prothrombin
- tPA (e.g. alteplase, tenecteplase)
    - Indication? Ischemic stroke within 3.5 hrs symptom onset
    - Reversal?
        - Aminocaproic acid
        - Tranexamic acid
            - Other indication? Postpartum hemorrhage
- Eculizumab
    - Mechanism? C5 inhibitor
    - Indication? Paroxysmal nocturnal hemoglobinuria
        - Pathophys? Defective GPI anchors
    - AE? Induced terminal complement deficiency
    - Ppx? Vaccinate against Neisseria meningitidis
- Hydroxyurea
    - Mechanism? Inhibits ribonucleotide reductase → increased Hgb F
    - Indication? Sickle cell disease
- Azathioprine & 6-mercaptopurine
    - Indication? Chemo

    - Metabolized by xanthine oxidase, so co-administration with xanthine oxidase inhibitors (e.g allopurinol) can cause toxicity
- Methotrexate
    - Mechanism? Inhibits dihydrofolate reductase
    - Indications?
        - Autoimmune disorders
        - Molar pregnancy
        - Choriocarcinoma
    - AE?
        - Hepatotoxicity
        - Bone marrow suppression → rescue with leucovorin
- Drugs that cause pulmonary fibrosis
    - Bleomycin (works in the G2 phase of the cell cycle)
    - Busulfan
    - Amiodarone
    - Methotrexate
- 5-fluorouracil
    - Mechanism? Inhibits thymidylate synthase
    - Indication? Chemo
    - Leucovorin WORSENS toxicity
    - Flucytosine is metabolized into 5-FU
- Cyclophosphamide
    - Mechanism? Alkylating agent
    - AE? Hemorrhagic cystis
        - Prevention? mesna
- Doxorubicin/daunorubicin (anthracyclines)
    - Indication? Breast cancer
    - AE? Irreversible dilated cardiomyopathy
        - Prevention? Dexrazoxane (iron chelator)
- Trastuzumab
    - Mechanism? Monoclonal Ab against HER2 tyrosine kinase receptor
    - Indication? HER2+ Breast cancer
    - AE? Reversible dilated cardiomyopathy
- actinomycin D
    - Indications?
        - Ewing sarcoma
        - Childhood cancer
- Vincristine/vinblastine
    - Mechanism? Inhibit microtubule polymerization
    - Indication? chemo
    - AE?
        - Bone marrow suppression (vinblastine blasts the bone marrow)
        - Peripheral neuropathy
- Taxanes (e.g. paclitaxel)
    - Mechanism? Inhibit microtubule depolymerization

- Platinum drugs (e.g. cisplatin)
  - Mechanism? Alkylating agents
  - AE?
    - Nephrotic
      - Prevention? Amifostine
    - Ototoxic
- 4 drugs that are nephrotoxic + ototoxic
  - Cisplatin
  - Vancomycin
  - Aminoglycosides
  - Loop diuretics
- Topoisomerase inhibitors
  - Irinotecan/topotecan → inhibit topo-1
  - Etoposide → inhibits topo-2
- Imatinib
  - Mechanism? Tyrosine kinase inhibitor
  - Indication? CML
- Rituximab
  - Mechanism? Monoclonal Ab against CD20
  - Indication? B cell cancers
- Tamoxifen
  - SERM
    - Antagonist in breast
    - Agonist in bone
    - Agonist in uterus
- Raloxifene
  - SERM
    - Antagonist in breast
    - Agonist in bone
    - No effect on uterus
- What med is used for breast cancer chemoprophylaxis in
  - premenopausal women? tamoxifen
  - postmenopausal woman? Aromatase inhibitors (e.g. letrozole, anastrozole, exemestane)
    - AE? Osteoporosis
- 5-alpha reductase inhibitors (e.g. finasteride, dutasteride)
  - Mechanism? Prevent formation of DHT
  - Indication? Long-term tx of BPH
- EPO analogs (e.g. darbepoetin, erythropoietin)
  - Indication? Anemia in CKD
- Filgrastim/sargramostim
  - Mechanism? G-CSF analogs
  - Indication? Profound bone marrow suppression in chemo pts
- Ondansetron
  - Mechanism? Serotonin receptor antagonist
  - Indication? Chemo-induced vomiting

- Aprepitant
    - Mechanism? NK-1 receptor antagonists
    - Indication? Chemo-induced vomiting
- Metoclopramide
    - Mechanism? Dopamine antagonist
    - Indication? Diabetic gastroparesis
    - AE? EPS
- ATRA
    - Indication? APML t(15,17)
- Bortezomib
    - Mechanism? Proteasome inhibitor
    - Indication? Multiple myeloma
- SGLT-2 inhibitors (e.g. canagliflozin)
    - Mechanism? Prevent renal reabsorption of glucose
    - Indication? DM
    - AE? UTIs
    - Contraindication? Renal insufficiency
- Conivaptan/tolvaptan
    - Mechanism? ADH receptor antagonists
    - Indication? SIADH
    - Very expensive!
- Mannitol
    - Mechanism? Non-absorbable sugar
    - Indications
        - Elevated ICP
    - Contraindication
        - CHF - mannitol increases vascular oncotic pressure → increased intravascular volume
- Loop diuretics
    - AE?
        - Nephrotoxicity & ototoxicity
            - Especially ethacrynic acid
        - Hypocalcemia & hypercalciuria
        - Hypomagnesemia
        - Hypokalemia
    - Contraindication?
        - Hx nephrolithiasis (dump Ca++ in the urine)
        - Sulfa allergy (all except ethacrynic acid)
- Thiazides (HCTZ, chlorthalidone, indapamide, metolazone)
    - AE?
        - Strongest association with hyponatremia
        - Hyper-GLUC (glucose, lipids, uric acid, calcium)
- Probenecid
    - Mechanism? Uricosuric agent (increases excretion of uric acid)
    - Restricted use because pt must be a uric acid underexcretion
    - Contraindication? Nephrolithiasis from uric acid stones

- Aldosterone receptor antagonists (e.g. spironolactone, eplerenone)
  - Indications?
    - CHF → prolongs survival
    - Conn's syndrome
    - Hirsutism in PCOS
    - Chronic tx of elevated portal pressures & esophageal varices
  - AE?
    - Gynecomastia (only spironolactone)
- ENaC channel blockers (e.g. amiloride, triamterene)
  - Indications?
    - Nephrogenic DI 2/2 lithium
- Aliskren
  - Mechanism? Direct renin inhibitor
- ACE-Is
  - Indication?
    - CHF → improves survival
    - Nephroprotection in DM
      - Dilate efferent arteriole → reduce intraglomerular HTN
    - Peripheral edema associated with dihydropyridine CCBs
      - Mechanism? ACE-Is dilate post-capillary venules
    - Scleroderma renal crisis
  - Contraindications?
    - Bilateral renal artery stenosis
    - C1 esterase deficiency
  - Don't start as first-line antihypertensive in African American pt unless that pt is diabetic
  - AE?
    - Dry cough
- ARBs
  - Good for pts with hx dry cough from taking ACE-I
- Ivabradine
  - Mechanism? Inhibits funny current channels
  - Indications? Symptomatic treatment of angina
- Class 1a antiarrhythmics (procainamide, quinidine, disopyramide)
  - Procainamide → use for WPW, AE drug-induced lupus
  - Quinidine → AE cichinism
  - Increase AP duration, wider QRS & increased risk Torsades
- Class 1b antiarrhythmics (e.g. lidocaine, mexiletine, tocainide)
  - Shorten AP duration
- Class 1c antiarrhythmics (e.g. flecainide, propafenone)
- Class 2 antiarrhythmics = beta blockers
- Class 3 antiarrhythmics = K+ channel blockers (e.g. amiodarone, sotalol)
  - Sotalol also has beta-blocking activity
    - Prolongs PR interval
- Class 4 antiarrhythmics = verapamil & diltiazem
  - Indications?

        - Afib rate control
        - Variant angina
        - Preventative tx for cluster HAs
- Dihydropyridine CCBs
    - Clevidipine & nicardipine → hypertensive emergencies
    - Nifedipine → safe in pregnancy
    - Nimodipine → prevents post-SAH vasospasm
- Digoxin
    - Mechanism? Inhibits Na-K ATPase
        - Positive inotrope
        - Muscarinic antagonist
    - Hypokalemia predisposes to toxicity
    - AE? Hyperkalemia
    - Tx of toxicity? Anti-dig Fab
- Magnesium
    - Indications?
        - Severe asthma exacerbations
        - Eclamptic seizures
- Atropine
    - Indications?
        - Organophosphate toxicity
        - Heart block
        - Bradyarrhythmias in ACLS
- Hydralazine
    - Mechanism? Arterial vasodilator → decreases afterload → increases CO
    - AE?
        - Reflex tachycardia
        - Peripheral edema
- Nitroglycerin
    - Mechanism? Venodilator
    - Indication? angina
    - Contraindications? Pt taking PDE-inhibitor
- Nitroprusside
    - Indication? Hypertensive emergency
    - AE? Cyanide poisoning
        - Tx? Amyl nitrate (oxidizing agent) + sodium thiosulfate
- Minoxidil
    - Indication? Balding in men
- Diazoxide
    - Mechanism? Opens K+ channel → prevents insulin release
    - Indication? insulinoma
- Nesiritide
    - Mechanism? BNP analog
    - Indication? Severe CHF
- Neprilysin inhibitors (e.g. sacubitril)

    - Mechanism? Neprilysin breaks down BNP, so neprilysin inhibitors prevent BNP breakdown
    - Indication? CHF
- PCSK9 inhibitors (e.g. alirocumab, evolocumab)
    - Mechanism? PCSK9 breaks down LDL receptors. PCSK9 inhibition → less breakdown of LDL receptors → can clear more LDL from serum
- Antistaphylococcal penicillins (e.g. nafcillin, dicloxacillin, oxacillin)
    - Cover MSSA
    - Indication? Mastitis
    - AE? Acute interstitial nephritis (fever + rash + eosinophils in blood or urine)
- Cefazolin (1st gen cephalosporins)
    - Indication? Surgical ppx
- Cefotetan/cefoxitin/cefuroxime (2nd gen cephalosporins)
- Ceftriaxone (3rd gen cephalosporin)
    - Indication? Neisserial infections
    - Does NOT cover MRSA or Pseudomonas
    - AE? Intrahepatic cholestasis in neonates → give cefotaxime
    - 3rd cephalosporin that covers Pseudomonas? Ceftazidime
- Cefepime (4th gen cephalosporin)
    - Covers Pseudomonas
- Ceftaroline (5h gen cephalosporin)
    - Covers MRSA
- Carbapenems (e.g. meropenem, imipenem, doripenem)
    - Covers Pseudomonas, anaerobes, and much more
    - Ertapenem doesn't cover Pseudomonas
- Aztreonam (monobactam)
    - Covers Pseudomonas
- Vancomycin
    - Mechanism? Binds to D-ala-D-ala, so transpeptidase cannot bind and create cross linkages
    - Resistance mechanism? Change D-ala-D-ala to D-ala-D-lac
    - Indications?
        - Covers Gram-positives including MRSA
        - Oral vanc → 1st line for C. diff
    - Does NOT cover Gram-negatives
    - AE?
        - Red man syndrome
            - Prevention? Slow infusion rate or give NSAID beforehand
        - Nephrotoxic + ototoxic
- Daptomycin
    - Mechanism? Disrupts cell membrane
    - Indications?
        - Covers Gram-positives including MRSA
    - AE? NMS
- Aminoglycosides
    - Mechanism? Bactericidal 30s inhibitor
    - Indications?

        - Covers Gram-negatives
        - Inhaled tobramycin → prevent Pseudomonas in CF pt
    - Does NOT cover anaerobes (because it requires O2 to gain entry to cell)
    - AE?
        - Nephrotoxic + ototoxic
        - ATN → muddy brown cases
- Tetracyclines
    - Mechanism? Bacteriostatic 30s inhibitor
    - Indications?
        - Zoonotic infections
            - Lyme disease
                - Avoid doxy in kids < 8 yo
            - RMSF
                - Give doxy to kids, give chloramphenicol in pregnancy
        - Cholera
        - Acne
        - Demeclocycline (causes nephrogenic DI) → SIADH
        - Tigecycline → covers MRSA
    - AE?
        - Photosensitivity
            - "SAT for a photo"
                - S = Sulfonamides
                - A = amiodarone
                - T = tetracyclines
        - Tooth dislocation
- Linezolid
    - Mechanism? Bactericidal 50s inhibitor
        - Prevents formation of the initiation complex for protein synthesis
    - Indication?
        - Covers MRSA
        - Covers VRE
    - AE? Serotonin syndrome (weak MAO-I activity)

Ep. 118: Confusing Breast Pathologies

- **Mastitis**
    - Unilateral erythema, tenderness, fever, recent postpartum
- **Abscess**
    - Unilateral painful, fluctuant mass, recent postpartum, fever
- **Engorgement**
    - Bilateral engorgement in recent postpartum F w/fever
- **Galactocele**
    - Unilateral could present as tender, fluctuant mass, in breast feeding F, NO FEVER
- **Inflammatory Breast Cancer**

    - Unilateral process in non-postpartum older F (50s +), peau d'orange

CROSS CHECKED? Yes

Ep. 119: Rapid Review Series 3 (IM)

Episode 119 notes were graciously provided by Divine Intervention from an anonymous contributor.

- Hypotensive, temp103, crackles at LLB, productive cough for 2-3 days: ***pneumonia sepsis***
    - Tx: cover MRSA, pseudomonas
        - *MRSA*: **vancomycin** (--| D-ALA), **linezolid** (--| 50S), **daptomycin** (--| gram+ by poking holes in cell membrane), **ceftaroline** (5th gen ceph), **TMP-SMX**, clindamycin (--| 50S), **doxycycline**
        - *Pseudomonas*: **ceftazidime** (3rd gen ceph), **cefepime** (4th gen ceph), **aztreonam** (monobactam), **fluoroquinolones**, **aminoglycosides** (--| bactericidal 50S, *do not cover anaerobes), **pip-tazo**, **carbapenems**
- 2mos fatigue, hyponatremic, hyperkalemic, elevated eosinophils, 80/50: ***Addison's disease***
    - RF: other autoimmune disease
    - Path:
        - autoimmune destruction of adrenal cortex
            - Zona glomerulosa: mineralocorticoids i.e. **aldosterone**
                - Not affected by *secondary adrenal insufficiency* (failure of hypothalamus)
                - Aldosterone is controlled by RAAS
            - Zona fasciculata: cortisol
                - --| eosinophils
                    - DDx of eosinophilia
            - Zona reticularis: sex steroids
        - Alpha intercalated cell pumps out protons into urine; aldosterone helps make this happen through excretion of K+. If no aldosterone --> non-anion gap metabolic acidosis (Type IV RTA)
    - Dx: ACTH/cosyntropin --> cortisol levels will not rise
    - Tx: fludrocortisone
- Dialysis a month ago, chest pain, difficulty breathing, bilateral/extremity edema, crackles: ***high-output heart failure***
    - DDx: AV fistula (arteries-veins w/o capillary resistance), Paget's disease (bone marrow becomes hypervascular), AV malformation, severe anemia (CO increases to increase O2 delivery)
- Blood glucose 900, HCO3 15, Na 125: ***DKA***
    - Vs. *HHNS* (not acidotic)
        - Pathophys: insulin prevents release of glucagon --> decreased lipolysis, production of ketone bodies
- Skin hyperpigmentation, Hgb 15, blood glucose 300: ***hereditary hemochromatosis***
    - Pathophys: C282Y mutation --> increased reabsorption of iron from gut
        - "bronze diabetes" d/t iron-Fenten (free radical) reaction that leads to fibrosis of pancreas
    - Skin: @skin, gonads, heart (1. restrictive 2. dilated cardiomyopathy), calcium-pyrophosphate-deposition disease/CPPD/pseudogout
        - ***CPPD*** ddx: hereditary hemochromatosis, ***Gitelman's syndrome*** (loss of ions @ tubules)
            - Positive birefringence, rhomboid crystals, chondrocalcinosis on imaging
    - Dx: ferritin
    - Tx: phlebotomy

        - "menstrual cycles are monthly phlebotomy" --> delayed onset in women
- Pneumococcal pneumonia, 118 Na: ***SIADH***
    - Pathophys: any lung or brain pathology!
        - DDx: small-cell lung cancer (ACTH, SIADH, Lambert-Eaton)
    - Sx: euvolemic hyponatremia
        - Urine is hyperosmolar
    - Tx: fluid restriction
- Vs. ***diabetes insipidus***: not observing effects of ADH in body --> not reabsorbing water --> hyperosmolarity, hypernatremia, low urine osmolarity
    - Dx: water deprivation, ADH analog (**desmopressin**)
        - urine osmolarity shoots up: ADH deficiency @ supraoptic nucleus of hypothalamus = ***central DI***
        - Urine osmolarity does not change: ***nephrogenic DI***
            - RF: lithium (also suicide preventative), demeclocycline
- Vs. ***Psychogenic polydipsia***: serum osmolarity goes down, urine osmolarity goes down (everything working fine)

Paraneoplastic phenomena

	Etiology	Pathophys
High hematocrit	*polycythemia vera, hepatocellular carcinoma, renal cell carcinoma*	
Moon facies, hypercortisolism	*small cell lung cancer*	Ectopic production that does not suppress with high dose dexamethasone
Smoker, pain in bones, finger clubbing	*lung cancer*	*hypertrophic pulmonary osteoarthropathy*
Dermatomyositis, polymyositis	*lung cancer*	
Sudden-onset acanthosis nigricans/**Leser Trelat sign**	*GI cancer*	
High Ca (tx fluids, biphosphonates i.e zoledronic acid)	*multiple myeloma, squamous-cell lung cancer,* mets, *sarcoidosis*	*multiple myeloma* (IL-1 = osteoclast-activating factor*),* *squamous-cell lung cancer* (PTHrP), lytic mets (i.e. from thyroid/renal cancer), blastic mets (i.e. from prostate/breast cancer), *sarcoidosis* (non-caseating granulomas produce 1alpha-hydroxylase calcidiol --> calcitriol --> reabsorption of Ca/P in gut)

Ep. 120: Rapid Review Series 4 (IM/Peds)

Episode 120 notes were graciously provided by Divine Intervention from an anonymous contributor.

- 80Y forgetful, impaired IADL, MMSE~20/30: ***Alzheimer's Disease***
    - Pathophys: low Ach (produced at **basal nucleus of Meynert** via **acetylcholinesterase)**
    - RF: Down syndrome (presenilin gene)
    - Tx:
        - AChE inhibitors = **donepezil, rivastigmine, galantamine**
- Kiddo w/ crying-->cyanosis, reverts back to normal after a while, heart = harsh holosystolic @ LLSB: ***Tetralogy of Fallot***
    - Pathophys:
        - aorticopulmonary septum usually tries to meet up w muscular interventricular septum
        - If aorticopulmonary septum descends to the right of muscular interventricular septum --> you're not dividing the heart too well
        - R side of heart: too little space now!
    - Sx:
        - Pulmonic stenosis
        - Right ventricular hypertrophy
            - R-L shunt (cyanotic)
            - Cry/squat --> compressing blood vessels --> increase SVR --> blood will prefer to go to pulmonic route --> L-R shunt
        - Overriding aorta
        - VSD

	RF	Sx	Tx
ASD		Wide-thick split of S2	
Aortic stenosis	Bicuspid +/- Turner's syndrome, old age	Syncopal episodes, angina, delayed carotid, systolic murmur @ RUSB	Replace valve; high mortality once sx develop ("ASH" 1. angina 2. syncope 3. heart failure)
Coarctation of the aorta		Hypertension in UE, hypotension in LE	
Aortic regurgitation		Bounding pulses, diastolic murmur @ LLSB	
PDA		Continuous machine-like murmur	

- ***Turner's syndrome***
    - Sx: Hypergonadotropic hypogonadism, horseshoe kidney, bicuspid valve, coarctation of the aorta
- Wide **pulse pressure**?
    - Adult: *aortic regurgitation*

  - Kiddo: *patent ductus arteriosus*
- ***Marfan's syndrome***
  - Sx: mitral valve prolapse ("myxomatous degeneration of the valve), aortic dissection ("cystic medial necrosis")
    - **Aortic** problems also a/w *Ehlers Danlos, ankylosing spondylitis, syphilis ("vaso vasorum of the arch")*
- Immigrant, diastolic murmur-opening snap: ***mitral stenosis***
  - RF: untreated GAS-***rheumatic fever***
  - C/b Afib

RF

  - AAA: smoking
  - Stroke, aortic dissection: HTN
  - Afib: mitral stenosis

- ***Carcinoid syndrome***
  - Sx:
    - 1. none if localized to bowel
    - 2. mets to liver release serotonin
    - 3. R-sided heart lesions ("TIPS" tricuspid insufficiency, pulmonic stenosis)
      - Does not affect lungs bc lungs can metabolize serotonin
  - Dx: elevated 5-HIAA
    - *Depression: low levels of serotonin, NE, dopamine --> low levels of serotonin metabolites (5-HIAA)

  - 5-hydroxytryptophan **-->** serotonin (5-HT)
    - Not making niacin/B3 bc all diverted to serotonin!
      - Sx: diarrhea, dermatitis, dementia, death
- Pt over last 3mos feeling very tired, skin hyperpigmentation, CBC looks terrible -- high eosinophil, sodium 123, potassium 6.5: ***addison's disease/primary adrenal insufficiency***
  - Pathophys: autoimmune destruction of adrenal cortex
  - Sx:

Adrenal cortex	Hormone missing	Sx
Zona glomerulosa	**Aldosterone** @ ENAC	Hyponatremia, hyperkalemia, RTA 4/ non-anion gap metabolic acidosis (H+ pump)
Zona fasciculata	**Cortisol**	Eosinophilia (lack of inhibition)
Zona reticulata		

    - Increased ACTH bc lack of adrenal response: pro-opiomelanocortin/POMC --> ACTH **-->** melanocyte-stimulating hormone --> hyperpigmentation
      - POMC = precursor to b-endorphin + ACTH + melanocytes
      - ACTH --| ***Tuberous sclerosis***: <1Y; seizure "infantile spasm"/*West Syndrome*
    - Vs. secondary adrenal insufficiency (Sheehan syndrome, etc): low cortisol, no sodium/potassium problems (maintained by RAAS)
  - Dx: ACTH stimulation --> cortisol levels do not rise
  - Tx: replace hormones (fludrocortisone, glucocorticoid)

Eosinophilia

  - *Drugs*
  - *Neoplasm*

- *Addison's disease*
- *Acute interstitial nephritis*
- *Allergies*
- *Asthma*
- *Collagen vascular disease (lupus, scleroderma)*
- *Parasites*

Cross checked? YES

Ep. 121: Rapid Review Series 5 (IM/Peds)

Episode 121 notes were graciously provided by Divine Intervention from an anonymous contributor.

- Chronic alcoholic, AMS, low-grade fever, vague abd pain w/ distension: ***spontaneous bacterial peritonitis***
    - NBS: paracentesis (>250 WBC, bugs)
    - Tx: ceftriaxone, fluoroquinolone (gram+ & gram- coverage)
    - Ppx: fluoroquinolone
    - RF: ascites, peritoneal dialysis, VP shunt (h/o hydrocephalus)
- Infection few days ago, got a drug, now 101.5 fever w/ small rash on face and trunk, eosinophilia: ***acute interstitial nephritis***
    - Sx: fever + rash + eosinophils (@blood or urine)
        - DDx *eosinophilia*
            - Drugs i.e. abx
            - Neoplasms i.e. hematologic malignancies
            - Asthma
            - Addison's disease (hyperkalemia, skin hyperpig, hypotension, etc)
            - AIN
            - Collagen/vascular disease i.e. scleroderma
            - Parasites
    - Dx: urine with elevated eosinophils

Urinalysis	Dx	Et
Eosinophils	***AIN***	Drug
WBC casts	***Pyelonephritis***	
pigmented muddy brown casts	***acute tubular necrosis***	intrarenal acute injury
reddish urine, but w/o RBC on microscopy	***Rhabdomyolysis/Myoglobinuria***	RF: alcoholics, older person fell down and couldn't get up, recent crush injury, combination of two myotoxic drugs (i.e. statins, fibrates, daptomycin)
RBC casts	***nephritic syndrome***	lupus, IgA, PSGN

fatty casts	***nephrotic syndrome*** (>3.5g/day)	minimal change disease, hematologic malig, FSGS 2/2 HIV/AA, membranous nephropathy 2/2 solid malignancy, diabetic nephropathy @ Kimmelstein nodules
Hyaline casts	***Dehydration***	Afferent arteriole underperfused --> RAAS --> Na absorbed in DCT, ADH release @ principal cell of nephron --> increased urine concentration

- Back pain
    - + lost sensation around buttocks, infertility: ***Leriche syndrome***
        - Et: severe PAD @ distal aorta + iliac arteries
        - RF: smoking
    - + lifting heavy boxes, sudden-onset severe back pain, paravertebral muscle tenderness: ***muscle strain***
        - Tx: NSAIDs, activity modification
    - + osteoporosis, positive straight leg raise: ***herniated disk***
        - Et: nucleus pulposus herniation --> impingement on nerve roots
        - Tx: rest + gradual return to activity for 6wks
    - + sudden-onset, severe abdominal pain, BP 100/50: ***ruptured AAA***
        - Dx: "draped aorta sign" = calcifications in front of vertebral bodies
        - RF: smoking
- 6 mos kiddo with loss of motor milestones, fasciculations: ***spinomuscular atrophy***
    - Vs. adult with fasciculations: ALS
    - Autosomal recessive @ chr5 SMN1 gene
- Kiddo with multiple bouts of pneumococcal sepsis, giardia, family members with multiple severe infections: ***Bruton's agammaglobulinemia***
    - Et: X-linked mutation @ Bruton's tyrosine kinase (B-cell maturation)
        - "humoral immunity defect/antibody defect"
        - Vs. T cell @ PCP, viral, fungal infections
    - Sx: show up after 6mos because mom's Ab protects until then
    - Dx: low levels of every Ig
    - Tx: monthly IVIG
- Kiddo with recurrent infections, petechiae on skin, bleeds when mom tries to brush teeth, eczema: ***Wiskott Aldrich syndrome***
    - Et: X-linked immunodeficiency
    - Sx: thrombocytopenia, eczema, recurrent infections
- Kiddo with recurrent abscesses with bacteria: ***CGD***
    - Et: mutation in NADPH oxidase (oxidative burst)
    - Sx: infection with catalase positive organisms (i.e. Staph, Serratia)
- Kiddo with immunodeficiency, seizures, recurrent parainfluenza, prolonged QT interval: ***diGeorge syndrome***
    - Et: failed development of 3rd/4th pouches (where T-cells reach puberty)
        - T-cell deficiency --> infections
        - *Hypocalcemia* --> prolonged QT, seizures
            - DDx: infants of diabetic moms
                - Sx: hypoglycemia 2/2 hyperinsulinemia developed in utero, VSD, HOCM
- Pediatric seizure, on desmopressin for nocturnal enuresis: ***hyponatremic seizure*** 2/2 ADH-analog over-secretion
    - DDx volume depleted kiddo: replenish with isotonic saline

Cross checked? YES

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Ep. 123: Ethics I

- 32 yo M s/p drug overdose in the ICU on a ventilator. No brainstem reflexes can be elicited. He is homeless and estranged from family. Girlfriend says that the pt wouldn't want this. Family wants everything done. NBS?
    - Withdraw care
    - Principle: If you have an accurate, recent representation of a pt's wishes, you should strongly consider following these wishes.

- Pt is septic with hallucinations and waxing-and-waning levels of consciousness. They don't want you to place IV to administer fluids and antibiotics. They say "I don't want any of those medications. Don't give me any of those poisons."
    - NBS? Administer abx and fluids against pt's wishes
    - Principle: If the patient isn't "with it" mentally, then their wishes don't count. Instead, do what the "rational person" would decide to do.

- 4 week old infant was brought to ED with 2-3 days of bilious vomiting. He has a hypokalemic hypochloremic metabolic acidosis. Upper GI series shows malrotation with volvulus. You recommend immediate surgical intervention. Parents do not want surgery. NBS?
    - Proceed with surgery against the parents' wishes
    - Principle: If something is life-threatening to a kid, perform the medically indicated intervention regardless of parents' wishes
    - Another example: child of Jehovah's witnesses that needs blood transfusion

- Adult with clear mentation has a life-threatening condition. You explain that they will die without treatment. They reiterate that they don't want the intervention. NBS?
    - Do NOT give treatment
    - Principle: adults with clear mentation have autonomy

- Man with hx Alzheimer's dementia is hospitalized. He has no written directives. Over the past several weeks, he's been jaundiced and has lost 15 lbs. Imaging shows metastatic pancreatic cancer. A study states that similar pts there is no survival with xyz intervention. Family member wants xyz intervention to be done. NBS?
    - Comfort care measures
    - Do NOT do something that is not medically indicated even if the family wants it
    - Principle: if it's not medically indicated, don't do it

- 14 yo kid with a medical condition requiring surgery. The child is developmentally normal and clearly mentating. The child does not want the surgery. Parents want the surgery. NBS?
    - Proceed with the surgery
    - Principle: If pt is < 18 yo, their don't matter (see exceptions below).

        - Exception: mental health
        - Exception: reproductive health (e.g. decisions regarding continuing pregnancy & abortion)
        - Exception: child married before age 18
        - Exception: emancipated minor

- Pt comes in with diffuse lymphadenopathy & chronic diarrhea. He reports inconsistent condom use with multiple partners. He tests positive for HIV. He doesn't want to tell his partner. NBS?
    - Inform the health department. The health department will perform partner notification.
    - Do NOT promise the patient that you won't inform authorities or that partners won't be told.
    - Similar to Tarasoff case (duty to warn when the pt expresses intention to harm another person)

- Pt says that he's going to kill his wife. You call the wife. Option 1 = tell the wife to get away and go somewhere safe. Option 2 = tell the wife all the details of how he is going to attempt to kill her.
    - Option 1 is best. Only give enough information so the other person can get out of the unsafe situation.

- Pt that is depressed. Pt says "I don't think I can take this anymore" and "I can't continue like this much longer." NBS?
    - Further screening for suicide OR hospitalization
    - Trick answer will be "give antidepressants." They will take too long to go into effect and the person may already be dead.

- Pt expresses suicidal ideation. NBS? Option 1 = ask the pt how they feel about hospitalization. Option 2 = more forceful approach, where you tell the pt that they will be involuntarily admitted.
    - Option 1 is best. Try to convince the pt to voluntarily be admitted before pursuing involuntary admission.

- "Mental status exam is negative for evidence of suicidality" → you do NOT need to bring this pt into the hospital

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Ep. 125: Rapid Review Series 6 (IM)

Episode 125 notes were graciously provided by Divine Intervention from an anonymous contributor.

- Young adult, AMS for last 3d, close acquaintances think they're "weird recently", obtunded, not an alcoholic, CSF with RBC: ***HSV encephalitis***
    - Sx: encephalitis/meningitis in newborn or young adult
    - Dx: @ temporal lobe
    - DDx
        - Subarachnoid hemorrhage: 2-3h duration
        - Bloody CSF tap
    - C/b increased ICP --> uncal herniation (***transtentorial herniation***) --| CN3 --> "down and out" eye w/ blown pupil (intact CN4,6), --| midbrain/contralateral cerebral peduncle --> ipsilateral hemiparesis
- TSA agent, IVDU (#risky behavior), 2wks losing weight, night sweats, hemoptysis, CXR hilar adenopathy + cavitary lesion: ***TB***

    - RF: travel, immunocompromised
    - Dx: serial acid-fast stains, TB skin test
        - Induration
            - >15mm: TB for all!
            - >10mm: healthcare worker
            - >5mm: HIV pt
            - f/u positive results with CXR --> latent vs active TB
            - *negative skin test does not rule out TB! (i.e. sarcoid, HIV)
        - Enhancement @ base of brain
        - Elevated lymphocytes in CSF
    - Tx:
        - Latent: **isoniazid** 9mo + B6/pyridoxine
            - Ae: drug-induced lupus, slow vs fast acetylators
            - B6 deficiency --| glutamine decarboxylase --> increased glutamate --> seizures
            - B6 deficiency --| ALAS (heme pathway) --> sideroblastic anemia
        - Active: **RIPE** 2mo + RI 4mo
            - Ae
                - **Rifampin**: hepatotoxicity, orange secretions
                    - Also used to treat leprosy (or dapsone, clofazimine)
                    - Also used for Neisseria meningitidis ppx (or cipro, ceftriaxone)
                - **Isoniazid**: B6 deficiency, neurotoxicity, hepatotoxicity; "INH"
                - Pyrazinamide: n/a
                - Ethambutol: color blindness
    - C/b *Potts disease* (@vertebral bodies)
- Painful sores under axilla, chronic: ***hidradenitis suppurativa***
    - Et: inflamed **apocrine** glands
        - Vs. sebaceous glands @ acne
    - Tx: surgery
- Obtunded, alcoholic/elderly, elevated Cr: ***rhabdomyolysis***
    - RF: crush injury, intense exercise
    - Dx: blood on dipstick w/o RBC on microscopy
        - *Hypocalcemia* --> prolonged QT
        - *Hyperkalemia* --> 1. peak t-waves 2. wide QRS 3. sine wave 4. asystole
            - Tx: calcium gluconate, insulin + glucose, albuterol, sodium bicarbonate, diuresis w/ furosemide, kayexalate
    - C/b acute tubular necrosis
    - Tx: fluids
- Drug overdose, wide QRS: **TCA**

Hypersensitivity rxn	Mechanism	Ex
Type 1	IgE (@basophils, mast cells) crosslinking --> release of cytokines	• Allergy history, episodic wheezing: *asthma* • *ABPA* (fungus ball in lung)
Type 2	antibodies against fixed antigen	• RBC: *autoimmune hemolytic anemia* • Gp2b3a: *ITP*

		● Follicular cells of thyroid gland/TSH receptor: *Graves disease*
Type 3	antigen-antibody complex "two people partner up together and wreak havoc"	● *PSGN* ● *Hypersensitivity pneumonitis* ● RF: close to warm spring, birds, farmer ● A/w *thermophilic actinomyces* ● Sx: ~ fibrotic lung disease, episodic lung sx
Type 4	delayed-type; T-cells/macrophages	● *Contact dermatitis* ● TB skin test ● *Poison ivy*

- Hot tub? Hot topic!
    - *Hypersensitivity pneumonitis*
    - ***Hot tub lung*** d/t mycobacterium avium complex
        - Sx: female with low level infection for 3wks
        - Not always immunocompromised!
        - Tx: macrolide
            - Ae: prolonged QT, erythromycin (diarrhea, pyloric stenosis in newborn)
    - ***Hot tub folliculitis*** d/t pseudomonas

Ep. 126: Rapid Review Series 7 (IM)

Episode 126 notes were graciously provided by Divine Intervention from an anonymous contributor.

- Newborn, leukocoria: ***retinoblastoma*** (Rb gene mutation)
    - C/b osteosarcoma
        - RF: Paget's disease (hypervascularized bone), teriparatide (pulsatile PTH analog)
        - Dx: Codman's triangle, sunburst pattern
        - C/b mets to lung
            - (Just like choriocarcinoma)
- 60M, back pain on walks, better with leaning forward: ***spinal stenosis***
    - MCC location: cervical spine
- 23F severe joint pain starting at L elbow, now in R knee, red vesicular lesions on skin, vaginal discharge: ***gonococcal arthritis***
    - NBS: ceftriaxone + doxy/azithro
    - Dx: no gram stain (@chlamydia, only seen with giemsa stain)
    - DDx migratory arthritis
        - Lyme disease
        - Rheumatic fever
- 89M, AMS, 103F, BP 90/65, HR 107bpm, RR 32, WBC 95k, Hct15% (Hb = 15/3 = 5), Plts 17k, fullness/tenderness of palpation in upper quadrants, recurrent bacterial infections***: chronic lymphocytic leukemia***

    - "isolated leukocytosis"
        - Infections still occur d/t immature proliferated WBC
    - Dx: CD5+, "smudge cell"
- 45M falling asleep a lot at work, BP 145/85, HR 87 bpm, RR 16, Hb 16, BMI 32: ***obstructive sleep apnea***
    - Dx:
        - chronic respiratory acidosis = chronic CO2 retainers
            - High HCO3 d/t kidney compensation
        - reactive polycythemia d/t chronic hypoxia (high EPO, Hct/Hb)
        - ~ COPD labs
    - Tx: CPAP, weight loss, uvulopalatopharyngoplasty (cut off some tissue in throat)
    - Vs. *central sleep apnea* (decreased respiratory drive)
        - Tx: **acetazolamide** --|CA --> waste HCO3 in urine via type 2 RTA --> metabolic acidosis stimulates respiratory alkalosis
- Elevated Hct, normal/low EPO: ***polycythemia vera***
    - RF: JAK2 mutation
    - Sx: "ruddy" appearance, aquagenic pruritus
- isolated, elevated **EPO**
    - DDx
        - HCC
        - VHL: hemangioblastoma, renal cell carcinoma
- 62M weight loss, cachectic, temporal wasting, quit smoking 6mo ago (74pack-year history), CXR spiculated cavitary lesion in LUL that shows dysplastic cells that are undifferentiated: ***squamous cell lung cancer***
    - Assoc w: hypercalcemia via PTHrP (stones, bones, groans, psych, short QT), exudative effusions, Pancoast tumor (--| sympathetic chain --> ipsilateral Horner's), diffuse joint pain (*hypertrophic pulmonary osteoarthropathy*)
    - Tx: surgery
        - *do PFTs (esp FEV1) before taking them to surgery!
    - Vs
        - Skin hyperpig, hyponatremia, Cushing-oid, LEMS: small cell lung cancer
            - Tx: metastatic @ dx!
            - Assoc w
                - SIADH: euvolemic low serum osm, high urine osm
                - ACTH: will not suppress w cortisol d/t exogenous production
                - LEMS: prox muscle weakness d/t Ab to presynaptic Ca channels; improves w use
                    - Dx: incremental (better & better) response with nerve stimulation
                    - @arms, legs (vs. bulbar sx @ MG)

Ep. 127: Rapid Review, Series 8 OB/GYN

- Pt w/CD4 150 cc of vaginal itching. KOH show pseudohyphae → **Candida**
    - Risk factors for candida: DM, IC, chronic steroid use, abx use, smoking
    - Vaginal pH is <4.5
    - Tx: topical antifungal
- How often for paps:
    - Every 3 years after 21 yo

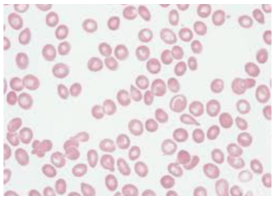
    - IC or HIV → once a year
- Old lady with vaginal itching → **lichen sclerosus**
    - Dx: punch biopsy to r/o vulvar carcinoma
    - Tx: clobetasol (high potency topical steroid)
- Bacterial vaginosis is a risk factor for **preterm delivery** in pregnant women
- 35 yo F w/multiple sexual partners, 6 mos of 30 lb wt loss, high creatinine → cervical cancer
    - MCC of death: lesion spreads to the ureters (obstructive uropathy)
- Mullerian duct gives rise to fallopian tubes, uterus, cervix, and upper ⅔ of vagina (NOT OVARIES) → producing estrogen so they still have breasts in **mullerian agenesis**
    - Will also still have testosterone → axillary and pubic hair
    - Lack a uterus = mullerian duct agenesis
- **Androgen insensitivity syndrome**:
    - High testosterone but non responsive → no axillary or pubic hair
    - Lack a uterus, genotypic XY
    - Have breasts b/c fat converts aromatase to estrogen
- Pt virilizes over the course of a year in puberty → **5 alpha reductase deficiency**
    - Genotypic XY, phenotypic XX until puberty
    - Testosterone is not converted to DHT → not virilization at birth
    - Normal testosterone, normal estrogen, + uterus, small beard, no male pattern baldness
- Old guy with suprapubic mass, anuria, high creatinine next step → **BPH**
    - Scarring of renal cortex, dribbling urine
    - Next step = cath
    - Tx: a1 antagonist to dilate the urinary neck, tamsulosin is specific for bladder (no ortho hypotension), long term tx finasteride or dutasteride (shrink prostate)
- Wide QRS = TCA toxicity → tx w/sodium bicarb
- **Myocarditis** → dilated cardiomyopathy, systolic dysfunction, S3
    - Causes: Coxsackie B, T. cruzi, anthracyclines (doxorubicin → give dexrazoxane), trastuzumab, clozapine
- Milrinone → phosphodiesterase inhibitor in cardiac and smooth muscle
    - Increases cAMP, increased cardiac contractility, BV dilation, decreased afterload, wide pulse pressure

These are my personal notes that I took when originally listening to the podcast. I hope they help!
Cross Checked: No

Ep. 128: Rapid Review Series 9 (IM)

Episode 128 notes were graciously provided by Divine Intervention from an anonymous contributor.

- 70F with bad shoulder pain, pain on L shin and LE; PEx shows step off on shoulder, WBC nl, Hct low, plt nl, Ca 12.7, BUN and Cr elevated: ***multiple myeloma***
    - NBS: SPEP, MPEP
        - Only transfuse if Hgb < 7!
        - DEXA scan, bisphosphonates only if suspect osteoporosis (most of the question points towards multiple myeloma!)
    - Sx:
        - Calcium: hypercalcemia d/t plasma cell IL-1 secretion (osteoclast activating)
        - Renal: light chains screw up kidneys
        - Anemia: proliferation of cells that take up the bone marrow --| hematopoiesis

        - Bone pain: pathologic fractures
            - **Lytic lesions** "LTR"
                - (also seen in lung CA, thyroid CA, RCC)
                - Vs. blastic (prostate, breast CA)
    - Dx
        - Rouleaux formation of RBC
        - SPEP, MPEP: monoclonal spike
        - Bone marrow biopsy: >10% plasma cells
- 65M with pancytopenia, peripheral smear shows **tear-dropped** shape RBC ("dacrocytes"): ***primary myelofibrosis***
    - 
- 80F 6mo history of recurrent infections, WBC 87k, Hgb low, recurrent pneumococcal infections: ***CLL***
    - Dx: **smudge cell**

Heme malignancy algorithm

- LL lie at extremes of age
    - ***ALL***: very young
        - RF: Down syndrome
        - *sx onset + decline can be sudden
    - ***CLL***: older (70-80Y)
        - *classically presents with recurrent infections d/t haphazard B-cell production
- Middle age
    - **Auer rods**: Acute promyelocytic leukemia
        - Sx: DIC d/t auer rods spilling into circulation
        - Pathophys: 15:17 translocation
        - Tx: all-trans-retinoic acid ATRA (vitA derivative)
    - Bcr-Abl fusion protein, philadelphia chromosome, myelocyte proliferation: ***chronic myeloid leukemia***
        - Pathophys: 9:22 translocation (philadelphia)
        - Tx: imatinib (tyrosine kinase inhibitor)

- 78M, RBC stuck like coins ("rouleaux"): ***multiple myeloma***
- 78M, pancytopenia, **dry tap** on bone aspiration:
    1. ***Primary myelofibrosis***
    2. ***Essential thrombocythemia (a/w JAK2 mutation)***
    3. ***Aplastic anemia***
- 70F, 6mos recurrent infections, WBC 47k, many cells in different stages of aspiration that are MPO+, reduced ALP activity: ***chronic myeloid leukemia***
    - Vs *leukemoid reaction*: good WBC, elevated ALP (WBC marker)
- 55M, s/p heme malignancy treatment, DIC: ***acute promyelocytic leukemia***
    - *DIC* = low Plt, high fibrin degradation product, high PT/PTT
    - Tx: ATRA
- 5F 6wks of weight loss, daily fevers, low Hgb/Plt, high WBC, cells +TdT: ***ALL***
- 50M, peripheral smear shows B-cells with bi-lobed nucleus: ***Hodgkin's lymphoma***
    - Dx: "Reed-Sternberg cells" CD15+ CD30+
    - Epi: @ young ppl + 40s-60s
- H/o CML, high fevers, weight loss, diffuse LAD for 3wks: progression of CML --> *AML* = ***blast crisis***

- 45F with 6mo history of intense pruritus, conjugated hyperbili, intrahepatic bile ducts dilated: ***primary biliary cholangitis***
  - Dx: anti-mitochondrial Ab
  - Tx:

    UDSA/ursodiol
    Liver transplant
    (diphenhydramine for itching)
- 45M with h/o UC, 6mo history of pruritus, dilation of intra + extra hepatic bile ducts: ***primary sclerosing cholangitis***
  - Dx: p-ANCA (anti-MPO Ab)
    - Also seen in Churg-Strauss, microscopic polyangiitis, PSC
  - Tx:

    Liver transplant
- Newborn with conjugated hyperbili
  - DDx
    - *Biliary atresia*
    - Choledochal cyst, *Caroli's disease*
- 25M, recurrent hemoptysis, sinusitis, occasional hematuria: ***Wegener's/granulomatosis with polyangiitis***
  - Pathophys: antigen-Ab complexes = **T3HS**
  - Sx: rapidly progressive glomerulonephritis
  - Vs. *Goodpasture* (no sinusitis) = T2HS
  - Tx: steroids, cyclophosphamide
- 25M, new onset asthma, dysmorphic erythrocytes (RBC casts): ***Churg-Strauss/EGPA***
  - Dx: eosinophilia, p-ANCA
- 35F, intermittent discoloration of fingers, diffuse skin thinking: ***scleroderma***
  - *Limited CREST*: anti-centromere Ab, calcinosis, Raynauds, esophageal dysmotility, sclerodactyly, telangiectasias
  - *Diffuse*: anti-Scl70, anti-topoisomerase
  - C/b scleroderma renal crisis |-- ACEi
  - C/I vasospastic drugs i.e. sumatriptan (5HT agonist triggers vasoconstriction)
    - Also c/I for Prinzmetal angina
- 35F, labs nl, PEx nl, up-to-date for vaccines, benign 2/6 diastolic murmur with opening snap at apex: ***MS***
  - **TTE** required for
    - Systolic >= 3/6
    - Diastolic
    - Symptomatic
  - Vs
    - Influenza vaccine: required in fall
    - V/Q scan: r/o PE
- **Stress test**
  - c/I pre-existing EKG abnormality (i.e. RBBB), cannot exercise
  - Alternative: pharmacological stress test via speeding up heart
    - i.e. dobutamine (beta agonist), adenosine analog (ae: bronchoconstriction. c/I recent caffeine, theophylline, asthma)

Ep 129: (Targeted Pulmonary Review)

Pulmonary Function Tests

- Pt long term smoker presents with cavitary lesions on CXR and CT and presents with hypercalcemia -> SC cancer of the lung (Paraneoplastic fashion)
  - Why hypercalcemia? Parathyroid related peptide
  - NBS: Consider PFT’s (FEV1)
    - Why?
      - Understand lung function before and after. Plan is to resect part of the lung
      - Want to make sure pt has enough FEV1 to undergo surgery.
      - Fev1 500cc? probably not going to live
      - % is controlled by the good lung
  - What’s a reasonable FEV1 compatible with life?
    - Approx. 1 Liter
- Restrictive vs obstructive
  - NBS: Pulmonary Function test
- Pt. has rheumatoid arthritis. About to start on methotrexate (dihydrofolate reductase inhibitors).
  - NBS: Pulmonary Function Test
    - Why?
      - Methotrexate can be toxic to lungs
- Pt. started on methotrexate or amiodarone or busulfan or bleomycin?
  - NBS: PFT’s
    - Why?
      - Figure out lung function before starting therapy
- Pt. with bloody diarrhea and SOB
  - Think?
    - Neuromuscular problem (i.e., Guillain Barré – ascending muscle paralysis)
  - If it involves the airway?
    - Intubate!
  - What is used to monitor progression of Guillain Barré?
    - Spirometry

Lung Volume

- Restrictive vs Obstructive
- Restrictive
    - Pt. with fibrosis lungs, scarred down?
        - Pulmonary fibrosis
            - Why?
                - Lungs are scarred down. Like shrink wrap.
            - What is their lung volume?
                - Decreased
- Obstructive
    - Pt. with big lung volume, on imaging on CXR flattened diaphragm or hyperinflated lung. Tend to have air trapping.
    - Volume overload
        - Chronically exposed to increased volume
            - What does the body do in response?
                - Dilate
        - Chronic increased volume on lungs causes their lung to dilate over time. Expire systole (lung contract to release air) of lung. Air trapping = systolic lung function hard to get air out.
- Different Air
    - Total lung capacity (Sit down and take in all the air you can)
    - Forced vital capacity (all the air you try to blow out forcibly)
    - Residual volume = TLC – FVC
- Forced air volumes.
    - Measuring how much happens in 1, 2 or 3 seconds
    - How much air is blown out in one second?
        - FEV1
            - Most people?
                - 80 – 90% of air
            - Obstructive lung disease
                - Systolic function (ejecting air) is deficient
                - Barely blow anything out in one second
                    - “Ejection fraction of lung sucks”

        - FEV1/FVC ratio goes DOWN
    - Restrictive Disease
        - Lungs are shrink-wrapped. Can’t retain as much oxygen as normal. Can’t accommodate as much volume
        - 80% of income given to you in a year. I will give you 80k of 100k I make. If I only make 100 dollars, I’ll give you 80 dollars. Same thing happens with restrictive. We have less.
        - FEV1/FVC is normal or mildly increased. Getting little in only getting a little out.
- FEF 25 – 75%
    - FEF = forced expiratory flow
    - Surrogate to FEV1/FVC for OBSTRUCTIVE disease
    - If FEF is down = dealing with obstructive diseases
- Percent predicted
    - Population measure you want to remember: 70-80%
    - If you are less than 70% in FEV1 means probably have some lung pathology
    - If 120% = higher than normal lung volumes think obstructive
- DLCO
    - Gas exchange test for the lungs. How good of a job does lung perform with gas exchange?
    - Oxygen traverse’s alveolar membrane and wall of pulmonary capillaries and then to blood vessels
    - Pulmonary fibrosis is like having more stuff in the way (adding distance with fibrotic tissue) so diffusion is less efficient. Therefore, there is a decreased DLCO!
    - Apart from pulmonary fibrosis, what other conditions cause decreased DLCO?
        - Emphysema (Even though its obstructive)
            - Why?
                - Destruction of proteases
                - No membranes (no alveoli) no surface area for diffusion to happen.
    - DLCO of pt. with defect with ab on Type IV collagen (Goodpasture)?
        - Goodpasture.

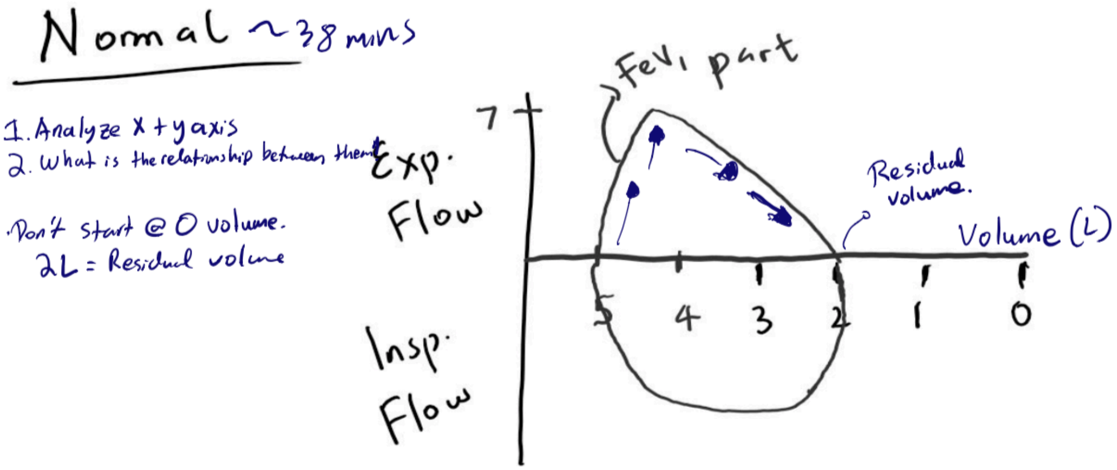
          - DLCO is high
            - Blood in lung? Essentially cut out middleman. No blood in vessels. Already at lung. As oxygen comes from the atmosphere it bathes blood directly. Therefore, increased DLCO

      - DLCO of pt with sinusitis, kidney problem (C-ANCA glomerulonephritis), hemoptysis?
        - Wegener
          - DLCO is high
            - Blood in lung? Essentially cut out middleman. No blood in vessels. Already at lung. As oxygen comes from the atmosphere it bathes blood directly. Therefore, increased DLCO
      - DLCO of pt with pulmonary hemorrhage?
        - DLCO is high.
      - DLCO for pt with extrapulmonary cause of restrictive lung disease?
        - DLCO is normal
      - Example of an obstructive disease with potential normal DLCO
        - Chronic bronchitis
      - BUT, remember that obstructive diseases with low DLCO
        - Emphysema (Assoc. with reduced surface area)
    - Pt. with asthma with equivocal spirometry?
      - NBS:
        - Methacholine challenge
          - Muscarinic receptor agonist.
          - Causes bronchoconstriction
- Ergotamine challenge
  - Prinzmetal angina or variant angina
    - Promote vasoconstriction

Look at Slides (~37 mins in)

Attached Slides

Normal flow volume loop



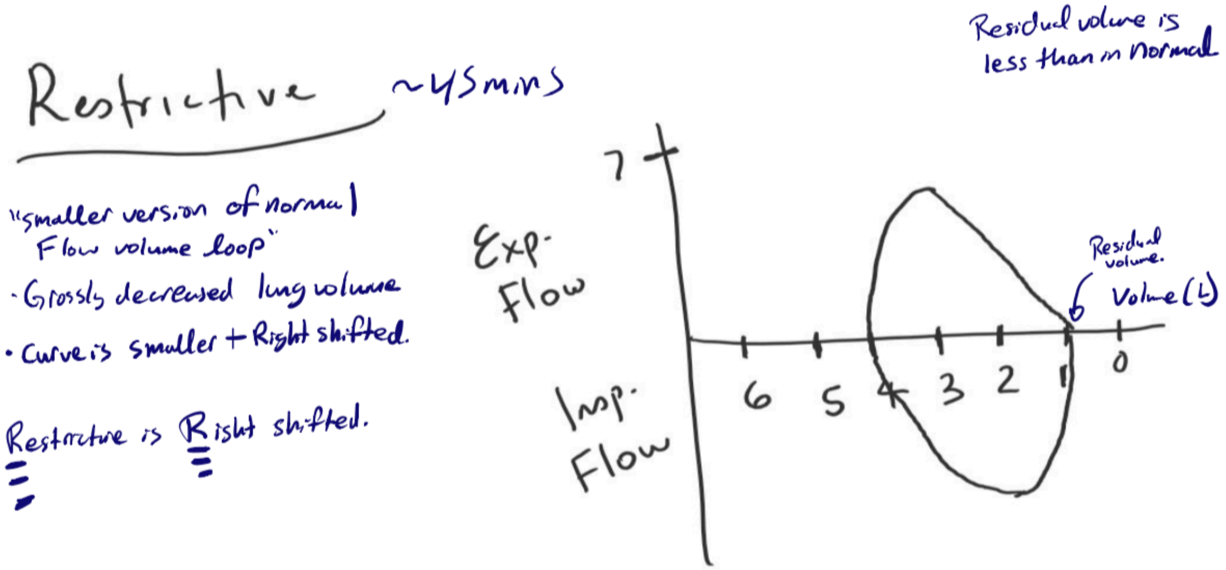
Normal ~38 mins

1. Analyze X + y axis
2. What is the relationship between them

·Don't start @ 0 volume.
2L = Residual volume

FeV1 part
7
Exp. Flow
Insp. Flow
Residual volume.
Volume (L)
5
4
3
2
1
0

Restrictive disease



Restrictive ~45 mins

"smaller version of normal Flow volume loop"

- Grossly decreased lung volume
- Curve is smaller + Right shifted.

Restrictive is Right shifted.

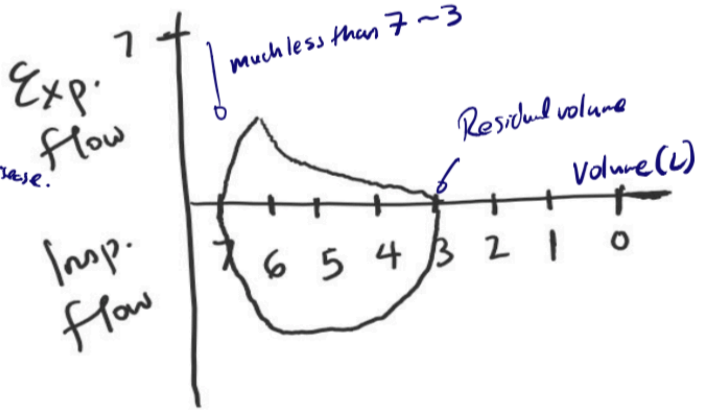
Residual volume is less than in normal

7
Exp. Flow
Insp. Flow
Residual volume.
Volume (L)
6
5
4
3
2
1
0

Obstructive disease

Obstruction

- Smaller.
- FEV_1 falls down like crazy
- Gradual tapering down exp. breath
- Residual volume ↑ in people with obs. disease.

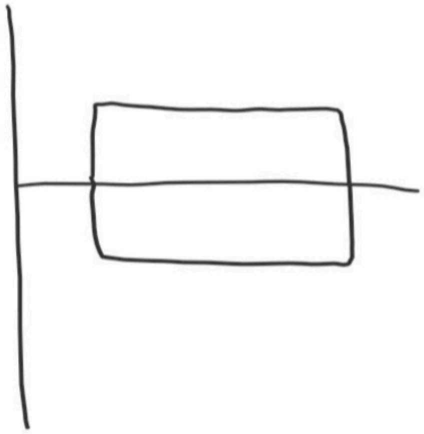

Exp. flow
Insp. flow
7
much less than 7 ~3
Residual volume
Volume (L)
7 6 5 4 3 2 1 0

Fixed obstruction

Fixed Obstruction

↳ box shaped!

- Foreign body in lung
- Tracheal Stenosis
  - L intubated for awhile



Oxygen delivery equation = Cardiac Output x Hemoglobin x O2 Sat x 1.34
+ (0.0031 x Pa02)

PAo2 = partial pressure of oxygen at Alveoli
Pao2 = partial pressure of oxygen at pulmonary capillary / blood vessels

What happens to patients with Hb 4?

- Oxygen delivery will drop (Cause Hb dropped)
- How to compensate?
  - Increase Cardiac Output (to meet oxygen delivery demands
  - Complications?
    - High output heart failure
- Patient hypotensive
  - Give fluid to expand and increase preload
  - Cardiac output goes up.

Increase oxygen concentration in liquid part not really improving oxygen content that much (0.0031 factor)

Pt has CO poisoning so your SaO2 is not great. CO takes the spot of Oxygen in Hb (which normally has 4 spots for oxygen)
-patient becomes hypoxemic
A-a gradient. What does it mean?

- Spread between PAO2 and PaO2.
- PAO2 = partial pressure of oxygen in the alveoli
  - PAO2 = 150 - (PaCO2 * 1.25)
  - Normal PAO2 is ~100. (PaCO2 is normally ~ 40)
- PaO2 = partial pressure of oxygen in the blood vessels

O2 comes into alveoli and then goes to the bloodstream. As time goes on you kind of lose little amounts of things (like oxygen). Let's say a patient receives 100 and then at blood vessels has 97 it means pt lost 3 of oxygen.

Usual A-a gradient = 10 or less. (Don't lose a lot of O2 between Alveoli and artery.)
If spread between A-a gradient high?
That means something in the lungs that's preventing the blood from being oxygenated properly.

- Pulmonary embolism
  - blood not flowing through part of the lung.
  - That lowers PaO2 making the gradient wider.

- Right to Left shunt PFO, VSD, or ASD with Eisenmenger physiology.
  - Intracardiac shunts (blood is not seeing oxygen form lung)
  - Blood bypasses the lung. Blood visibly not touching the lung.

        - PaO2 goes down, making the gradient wider.

- Pt has a big A-a gradient with a wide cardiac shunt.
    - Physiologic - in utero
        - Between pulmonary artery and aorta (Ductus arteriosus)
    - Hereditary hemorrhagic telangiectasia (Osler Weber Rendu)
        - Arteriovenous malformations
            - Pulmonary artery and vein connected
                - Blood not passing through capillaries not good gas exchange
            - Hypoxemia on a widened A-a gradient

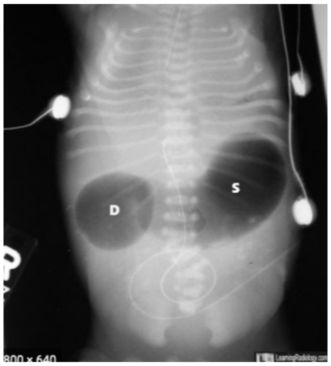
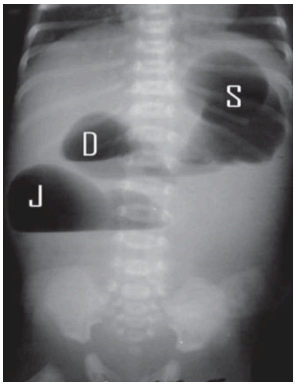
- Hypoxemia with normal A-a gradient
    - Think extrapulmonary causes
        - Overdose on opioids. RR down not receiving enough oxygen in the first place
            - PAO2 is not getting enough oxygen!
                - PaO2 will not get enough oxygen!
        - High elevations
            - Higher elevations = less oxygen content in the atmosphere

----

Ep. 130 : Rapid Review Series 10 (Peds)

- 2 yo kid has rhinorrhea for 2 days, mild fever, barky cough
    - Dx: croup
    - Patho: parainfluenza virus
    - Tx: supportive care
    - Symptoms
        - Subglottic problem
        - Steeple sign on CXR
        - Upper airway problem- **stridor**, less wheezing
            - If stridor is mentioned think of croup or epiglottitis
            - If wheezing (Lower airway) think of asthma and RSV pneumo (most common in >28 days old)
            - Kid in 1st month of life pneumo= GBS
- Kid presents with SUDDEN onset high fevers, grunting, drooling, tripod position
    - Dx: epiglottitis
    - Patho: staph aureus, strep pneumo or H.flu
    - ** not only kids can get epiglottitis, may see it in adults!
- Kid with really bad bouts of cough with cyanosis and vomiting
    - Dx: bordetella pertussis
    - *bacterial infection (lymphocytosis instead of neutrophilia) and WBCs are very high!
    - Vaccine preventable

  - Tx: macrolide (erythromycin * may prolong QT interval)
    - PPX for close contact give erythromycin
- New born that has bilious vomiting
  - Differentials (if they give you an abdominal xray ask: do i see a double or triple bubble?)
  -

Malrotation w/volvulus	***Duodenal Atresia***	***Jejunal atresia***
Dx: upper GI series ●	Double bubble on x ray  pathophys: Failure to recanalization -Associated w/ down syndrome	Triple bubble on x ray  Pathophys: associated with vascular problem

- Kid that is 10 percentile of weight, bone development problem, very tiny , FTT and floating stool
  - Dx: celiac disease
  - Pathophys: problem with microvilli
  - Check for anti-gliadin or anti-endomysial antibodies and anti-TGA
  - Tx: avoid gluten
  - Bone problems because cant absorb ADEK vitamins→ secondary hyperparathyroidism(low calcium, high PTH and low PO4)→ rickets or osteomalacia
  - Vitamin K deficiency- recurrent bleeds
  - Vitamin E deficiency: Acanthocytosis on blood smear beca
  - Vitamin A deficiency: night blindness
  - Derm: dermatitis Herpetiformis
- Pt has a h/o celiac and has lost a ton of weight over the last few months, abdominal distension
  - Dx: malignant degeneration
  - Causes an enteric associated lymphoma (EATL)
- Kid has intermittent abdominal pain and between episodes they feel ok
  - Dx: Intussusception- Telescoping of the bowel
  - Presentation
    - recent URI or GI infection
    - history of Meckel's diverticulum → no Rotavirus vaccine because can predispose intussusception
    - h/o IgA nephropathy- also avoid rotavirus
  - Tx: air or contrast enema - both diagnostic and therapeutic
- Kid has edema everywhere and had URI 4 days ago and has 4+ proteinuria
  - Dx: Minimal change disease

        - Effacement of the foot processes
        - Pee more that 3.5g of protein
            - oncotic pressure is very low= edema everywhere!
            - ascites may become infected→ **SBP** (parencetesis >250 neutrophils and treat with 3rd gen cephalosporin)
            - **DVT susceptible** and pee out antithrombin III so cant inhibit factor 10 and 2 and become hypercoagulable!
            - Budd chiari: hepatic vein thrombosis (usually in setting of Polycythemia vera)
            - renal vein thrombosis(usually in setting of pancreatitis)
        - MCC of nephropathy in kids!
        - Associations: URI, hematologic malignancies
    - Tx: glucocorticoids
- Renal Vein thrombosis usually associated in the setting of Membranous Nephropathy
- URI 4-6 weeks ago with dysmorphic erythrocytes/ RBC casts
    - Nephritic syndrome:
        - Post strep Glomerulonephritis - URI 2-6 weeks ago
            - Had a skin rash and then hematuria
            - Labs: AntiASO titers or Anti DNAse B antibodies (skin infection present)
        - IgA nephropathy : URI 2-6 days ago
- Kid has recurrent skin abscess and recurrent candidal or aspergillus infections
    - Dx: CGD
        - NADPH oxidase deficiency
- Kid has anaphylactic response to transfusions, recurrent URI and Giardial diarrhea
    - Dx: IgA deficiency
- Kid has recurrent URI and giardial infections in a *BOY after 6 mo of age*
    - Dx: bruton's agammaglobulinemia
        - Problem with B cell maturation (BTK gene)
        - GI infection is almost always giardia!
    - Tx: Monthly IVIG
- Kid has seizures, EKG = prolong QT interval and PCP infection
    - Digeorge syndrome
        - 3rd and 4th pouch dont form
        - Recurrent viral and fungal infections
        - Hypocalcemia→ prolong QT interval
        - Tracheomalacia
- Seizure in infant of diabetic mother= hypoglycemia
- Boy has recurrent infections, CBC= platelet 40000 and augmented lesions on skin
    - Dx: Wiskott aldridge syndrome
        - Associated with thrombocytopenia and eczema
- Male associated immunodeficiencies - X linked recessive
    - Wiskott aldridge
    - CGD
    - Bruton's Agammaglobulinemia

Cross Checked: YES

Ep. 131: Rapid Review Series 11 (OB, Psych, IM, Neuro)

Episode 131 notes were graciously provided by Divine Intervention from an anonymous contributor.

- 25F with multiple nose bleeds, Plt 10k, WBC nl, Hgb nl: ***ITP***
    - Pathophys: Ab-**Gp2b3a**
    - RF: lupus
    - Tx:
        1. Mild: observation
        2. Severe: steroids, splenectomy
            - *prior to splenectomy, vaccinate against SHiN
- Newborn, has not pooped for a wk:
    - ***DDx***
        - ***Hirschsprung's disease*** = aganglionic distal colon
        - ***Meconium ileus*** 2/2 CF
        - ***T. cruzi***
            - Big heart
            - Big colon
            - Big esophagus
    - Supposed to poop within the first 48h!

	Septic arthritis	***osteomyelitis***
pathophys	Infection within a joint	Infection within a bone
sx	Tenderness over joint	Tenderness over bone
dx	Arthrocentesis with high WBC	MRI, Triple phase bone scan
tx	Joint washout, abx	Abx

- Postpartum, looking for means of contraception, what to avoid?
    - **Estrogen**-based contraceptives!
        - Other c/i:
            - VTE
            - Stroke
            - MI
            - Breast ca (ER/PR responsive)
                - *also avoid progestin-containing OCP
            - Hepatic adenoma
            - >35 + smoker
            - HTN
- **Copper IUD** best means of emergency contraception; c/I heavy menstrual bleeding
- Protect against STIs? Condoms or abstinence
    - Spermicides do not offer protection!
    - RF: IUD, diaphragm
        - c/b *toxic shock syndrome*

- I**njectable progestin** analogs q3mo: c/I rapid return to fertility
- **Progestin IUD** Mirena --| *adenomyosis*
- Basal body temperature measurements
    LH surge
    Progestin makes temperature rise = the egg is around! Have intercourse!
- Kiddo w difficulty hearing, cataracts, deaf uncles, RBC casts in urine: ***Alport syndrome***
    Sx: boy who "can't see, can't pee, can't hear a high C"
    Pathophys: **COL4A5** mutation @ Type4 collagen; X-linked
- *Genital warts*
    Pathophys: **HPV 6, 11**
    NBS: screen for STIs, Pap smear if >21Y
- **Pap smear**
    Cytology: q3y
    HPV + cytology: q5y
    *pap smear every year if immunodeficient
    HPV vaccine 11-26Y
    + pap smear --> **colposcopy**
      Atypical glandular cells? Endometrial biopsy!
    MCC death d/t cervical cancer: invasion of ureters
- 75M with impaired IADL: ***Alzheimer's dementia***
    Pathophys: low Ach (@basal nucleus of Meynert), decreased choline acetyltransferase (CHAT)
    - *CHAT deficiency*: no Ach! **-** edrophonium test, similar sx to MG
        - Vs. MG: + edrophonium test

    RF: age, FMHx, Down syndrome
- ***Squamous bladder cancer***
    RF:
    1. Smoking
    2. Anilin dyes
    3. Cyclophosphamide
    4. Schistosoma haematobium
    - Vs glandular d/t failure of urachus involution
- 35F morning stiffness, pain in fingers: ***rheumatoid arthritis***
    - Dx: anti-RF (IgM-IgG), anti-CCP
    - Tx: methotrexate, NSAIDs
        - *PFTs before starting methotrexate dt ae: pulmonary fibrosis, hepatotoxicity
            - Rescue bone marrow with leucovorin

Cerebrospinal fluid

Sx	Dx	CSF	Tx	
Dementia for 3 weeks, myoclonus, death	***CJD***	elevated 14-3-3 protein		
Bloody diarrhea two weeks ago, symmetric ascending paralysis, shortness of breath	***Guillain-Barre syndrome/acute inflammatory demyelinating polyneuropathy***	Albumin-cytologic dissociation	○ **plasmapheresis** > IVIG ○ Plasmapheresis also used in tx of TTP	○ RF: URI, GI illness ○ NBS: spirometry

	MS	oligoclonal bands		Can also dx with MRI
	Narcolepsy	low hypocretin		
	SAH	Xanthochromia		
	HSV	RBC		@temporal lobes
Morning headache, papilledema	***Pseudotumor cerebri***	High opening pressure (>250)		
	Bacterial meningitis	High opening pressure, lots of neutrophils, low glucose		
	Fungal meningitis	High opening pressure, lots of lymphocytes, low glucose		

- Episodic palpitations, HA, hypertension: ***pheochromocytoma***
  - NBS: check metanephrine levels (HVA, VMA)
  - Dx: MIBG scan, posterior mediastinum
  - Pathophys: chromaffin cells of adrenal medulla (~ sympathetic neuron)
  - RF: MEN2 (MCC sx is MTC), NF1
  - Tx:
    1. Alpha blockade i.e. phentolamine, phenoxybenzamine
    2. Beta blockade
    3. Surgery
       - Profound hypertensive crisis during surgery d/t spilling catecholamines?
         - NBS: phentolamine, nitroprusside
- Anti-vaxxer, coughing paroxysms: ***pertussis***
  - Tx: macrolide
    - Ae: prolong QT interval, diarrhea
- "Weird cluster of sx": rock-hard thyroid gland, hypothyroid, recurrent epigastric pain radiating to back, no biliary tract dz, no EtOH: ***IgG4 related disease***
  - =
    - *Reidel's thyroiditis*
    - *Interstitial lung disease*
    - *Autoimmune pancreatitis*
    - *PSC*
    - *Recurrent cholecystitis*
    - *Prostatitis*
    - Urinary retention 2/2 retroperitoneal fibrosis

Ep. 132: Weird topics of Social Sciences (Version 2)

- Pt with terminal lung cancer in hospice that's not really eating. What meds can you give them?
    - Megestrol (progestin analog)
    - dronabinol (cannabinoid)
    - corticosteroids
    - don't improve survival or reduce morbidity

- Pt with terminal lung cancer in hospice with depression. What meds would you try?
    - Stimulants: methylphenidate
    - If super anxious, consider benzo
    - SSRIs will take too long to act

- Pt with metastatic malignancy complains of SOB. What meds would you try?
    - Opioids (e.g. morphine) + bowel regimen

- Pt on chemo with severe n/v. What meds would you try?
    - Ondansetron (serotonin receptor antagonist)
        - Adverse effect? QT prolongation

- Pt with terminal GBM. Days to week to live. Feels nauseous in the context of increased ICP. NBS?
    - Glucocorticoids to reduce ICP

- Pt with burning & tingling in extremities (neuropathic pain). What meds would you try?
    - TCAs
    - SNRI (e.g. duloxetine)
    - Gabapentin/pregabalin

- Pt with cancer pain & hx of depression on treatment. Pt was started on pain med and started to have fevers + myoclonus → serotonin syndrome 2/2 tramadol
    - Tramadol is usually not a good choice for cancer pain because it's not that strong and has lots of interactions

- Pt with widely metastatic cancer to liver & kidneys presents with severe pain. What pain med would you consider? Fentanyl patch
    - Avoid morphine in liver & kidney disease

- Pt with bad cancer pain. Morphine dose was increased at last visit. Pt returns and is still in severe pain. NBS? Increase dose or frequency of their opioid regimen

- Pt with metastatic malignancy in hospice complains of pain. What drug should be avoided? Meperidine
    - Why? Can cause seizures
- Physician that smells of alcohol. NBS?
    - Report it to higher authority (e.g. the supervisor, ethics committee, medical board)

- Pt is being treated for cancer with intent to cure. Can they receive palliative care? YES
    - Palliative care does NOT preclude life-prolonging therapy
    - Contrast with hospice care (physician must determine that pt has less than 6 months to live before they can start hospice)

- Medical error was made. NBS?
    - Admit error to pt
    - Data suggests that the most likely outcome is the physician NOT getting sued

- Physician-assisted suicide
    - Illegal in every state

- 60-70s yo pt that is very ill. Some medical therapies remain but the pt is not interested. NBS?
    - Respect the pt's wishes as the pt
        - Understands the situation
        - Understands the risks & benefits
        - Communicates their choice clearly

- Pt requests a therapy that is not standard of care and won't affect outcomes. NBS?
    - No obligation to administer futile therapy

- Pt requests abortion. Physician doesn't feel comfortable performing the procedure. NBS?
    - Transfer care of the pt to another physician who can perform the procedure

- Old senile person that isn't taking meds as prescribed. Keeps getting admitted for problems that result from inability to take care of himself/herself. NBS?
    - Appoint legal guardian

- Adolescent < 18 yo → parents make decisions regarding medical care
    - Exceptions:
        - Substance abuse
        - Mental health
        - Reproductive health

- Capacity vs. competence
    - Capacity
        - Criteria: understands the situation, understands the risks & benefits, clearly communicates a decision to provider
        - Determined by physician
        - Examples of when pts lack decision-making capacity:
            - Delirium/AMS
            - Under the influence of drugs
    - Competence
        - Determined by legal system

- 23 yo M that overdosed on opioids, now comatose in the hospital. Next-of-kin decides to withdraw care because pt said “I don’t want to be on life support.” What principle was followed?
    - Substituted judgment

- Pt is comatose. Surrogate decision maker is deciding between treatment option A and option B. They choose option A because the physician provides that data that it produces better outcomes in some regard. What principle was followed?
    - Best interest standard
    - What they

- The physician treating unresponsive trauma pt John Doe does what is medically indicated in the situation. What principle was followed?
    - Best interest standard

- Pt previously designated someone as their healthcare POA. They will make decisions on the pt’s behalf if the pt can’t make decisions for himself.

- What is a living will?
    - Document where pt outlines certain interventions that they would/would not want

- What is the surrogate decision-maker order if there is no healthcare POA designated
    - Spouse → adult children → parent → adult sibling

- Following HIPPA laws
    - Don’t disclose pt’s information to family members without their authorization
    - Exceptions:
        - Protecting pt (e.g. protect pt from killing themselves)
        - Protecting general public (e.g. homicidal ideation)
        - Following the law

- Resident is finishing shift and is getting ready to handoff to night team.
    - Handoff should happen in person
    - Provide key pieces of information in a standardized fashion
        - Use if-then statements
        - Key active problems
        - Key medications
        - Labs to f/u

- If a medical error occurs, what is the first thing that should happen? Analyze the error!
    - Fishbone/Ishikawa diagram
        - Keep identifying factors that contributed to the error

- Core principle of QI? PDSA cycle
    - P = plan (planning the intervention)

  - D = do (putting the intervention into practice)
  - S = study (study the results)
  - A = act (refine the intervention)

- Diagnostic errors
  - Pt was cough + dyspnea + CP. Physician that has seen that presentation before and previous pt ended up having pneumonia. Physician assumes that this pt must also have pneumonia. → availability bias
  - Pt presents with certain set of sxs. They were previously hospitalized for the same sxs and a diagnosis of PNH was made. Resident assumes that sxs are again due to PNH → anchoring bias
    - Depending too heavily on an initial piece of information or the first idea that came to mind
  - Resident coming onto nightshift is assigned a pt that was just admitted by the attending. The resident doesn't question the diagnosis or think of other possibilities. → blind obedience bias
  - Pt presents with cough + fever + CP. CXR shows consolidation. Resident says "this must be pneumonia" and doesn't consider other things → premature closure

- Pt is undergoing IPV at home. What screening method could be employed to detect IPV?
  - HITS (does your partner hurt, insult, threaten, or scream at you?)
  - HARK (humilitation, afraid of partner, rape, kick)
  - STAB (slapped, threatened,

- Screening tools for alcohol abuse
  - FIRST quantify their drinking
  - Definition of "at risk drinking"
    - Woman OR >65 yo: >7 drinks/week or >3 drinks/one sitting
    - Man : >14 drinks/week or >4 drinks/one sitting
  - THEN employ formal screen
    - CAGE
      - Cut Down
      - Annoyed
      - Guilt
      - Eye opened
    - AUDIT-C is better than CAGE
  - Clues that suggest alcoholism on NBMEs:
    - Megaloblastic anemia (MCV > 100)
    - High GGT
    - AST/ALT > 2:1
  - Signs/sxs of alcohol withdrawal → give benzons
    - E.g. alcoholic hallucinosis, DTs
  - Remember thiamine before glucose if alcoholic comes to ED
    - This avoids precipitating Wernicke-Korsakoff syndrome
  - If person is delirious because they are withdrawing from EtOH
    - Don't give antipsychotic (anti-dopaminergic agent) because this can cause seizures
    - Tx? Benzos

- Pt addicted to opioids
    - Tx? Suboxone (buprenorphine/naloxone)
- Pt going through opiate withdrawal
    - Tx? Clonidine

- Pt that is trying to quit smoking. What tx would you consider?
    - Nicotine replacement therapy
    - Bupropion (NDRI)
        - Contraindications: eating disorder
    - Varenicline (nicotinic receptor partial agonist)
    - Most effective? Combination > varenicline > bupropion > NRT
    - Never choose e-cigarette on NBME

- Screening for AAA?
    - US for men age 65-76 if they've ever smoked or have a family hx

- Screening for osteoporosis?
    - Women > 65 yo
    - Women < 65 yo with risk factor (e.g. anorexia, prolonged steroid use)
    - FRAX > 9.3
    - T < -2.5 → bisphosphonate

- Screening for cervical cancer
    - Age <21 → NO Pap
    - Age 21-29 → Pap q3y
    - Age 30+ → + cotesting Pap q5y
    - HIV or immunodeficiency → yearly Pap
    - Hysterectomy for benign reasons → no screening
    - Hysterectomy for endometrial hyperplasia/cancer→ Pap of vaginal cuff

- Screening for colon cancer
    - Methods
        - Colonoscopy every 10 years
        - Flex sig every 5 years
        - Flex sig every 10 years + annual FIT
        - Annual FIT
        - Annual FOB
    - Age
        - No family hx → age 50
        - Family hx → age 40 OR 10 years before dx of relative (whichever is earlier)
            - E.g. mother had colon cancer at age 53 → start at age 40

- Screening for lung cancer
    - Annual low dose CT scan

  - Criteria:
    - Age 55-80
    - Current smoker OR quit < 15 years ago
    - 30 pack-year smoking hx

- Screening for prostate cancer
  - Shared decision-making
  - > age 70 → NOT recommended

- Screening for breast cancer
  - USPSTF: start at age 50, do it every 2 years
  - ACS: start at age 40, do it every year
  -
- Vaccines
  - Healthcare workers should get Hep B
  - Influenza every year in the fall
  - 1 dose Tdap + Td booster every 10 years
    - Tdap in every pregnancy at 27-36 weeks
  - Varicella can't be given to infants < 1 year old
  - HPV:
    - Girls age 9-26
    - Boys 11-21
    - MSM 11-26
  - Meningococcal vaccine
    - Teens going to college
    - Military recruits
  - Asplenic or functionally asplenic → vaccinate against encapsulated organisms
    - Strep pneumo
    - H. flu
    - Neisseria meningitidis
  - Pt on eculizumab (monoclonal Ab against C5) or terminal complement deficiency → vaccinate against Neisseria meningitidis
  - Can pt with egg allergy can influenza vaccine? YES
  - Live attenuated vaccines
    - Varicella
    - Zostavax Herpes zoster
    - MMR
    - Yellow fever
    - Intranasal influenza
    - Oral polio
  - Who shouldn't get live attenuated vaccines?
    - Babies < 1 year
    - Pregnant women
    - HIV with low CD4 (<200)
  - Inactivated vaccines

        - Hep A/B
        - Tdap → toxoid
        - Pneumococcal
        - Meningococcal
        - Influenza (injection)
        - Polio (injection)
        - Shingrix Herpes zoster
    - Pneumococcal vaccine
        - https://www.cdc.gov/vaccines/vpd/pneumo/downloads/pneumo-vaccine-timing.pdf
        - >65 yo → just PPSV23 OR PCV13 then after 1 year PPSV23
        - <65 yo with certain conditions → PCV13 then after 8 weeks PPSV23
            - Asplenic*
            - Sickle cell (functionally asplenic)*
            - Immunocompromised*
                - HIV
                - CKD
                - Nephrotic syndrome
                - Transplant
                - Hematologic malignancy
            - Cochlear implant or CSF leak
            - *get second dose of PPSV23 5 years later
        - <65 yo with chronic disease → just PPSV23
            - DM
            - Heart disease
            - Liver disease
            - Lung disease
            - Smoking
            - Alcoholism

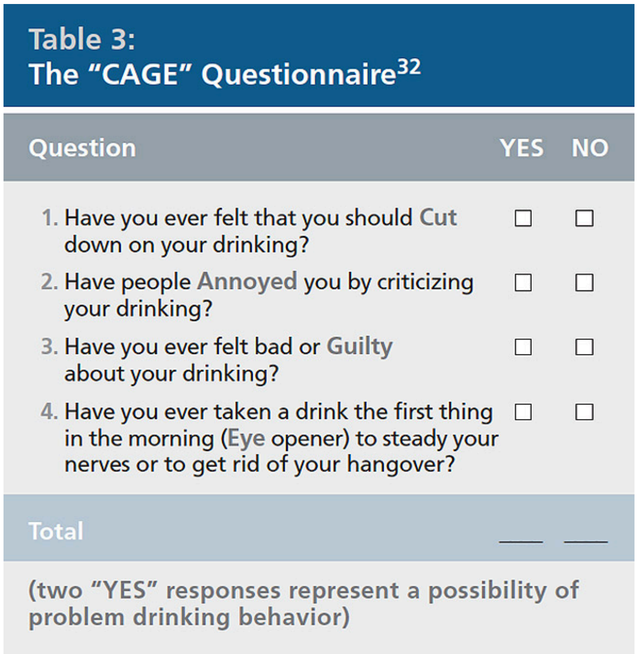
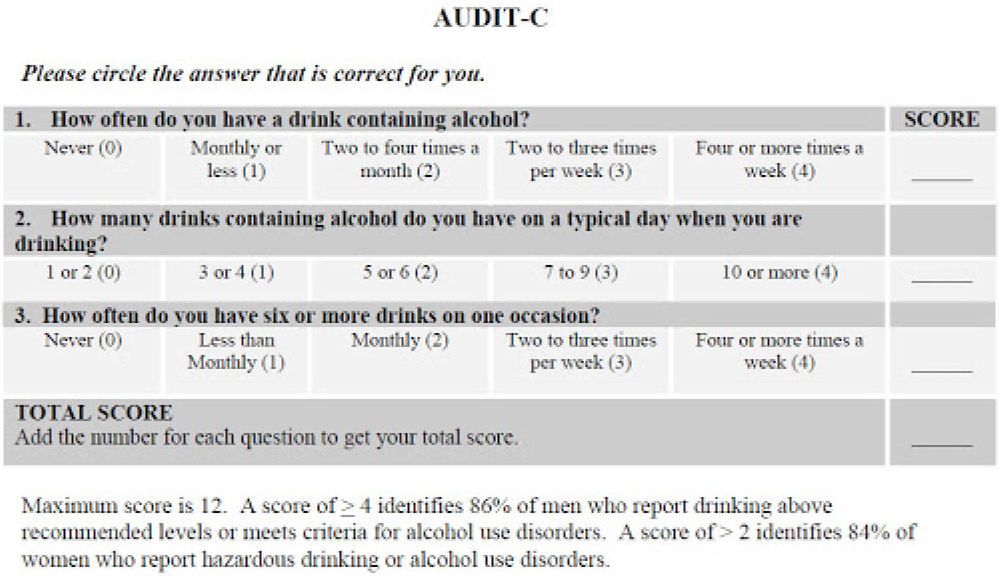


Table 3:
The "CAGE" Questionnaire[32]

Question	YES	NO
1. Have you ever felt that you should Cut down on your drinking?	☐	☐
2. Have people Annoyed you by criticizing your drinking?	☐	☐
3. Have you ever felt bad or Guilty about your drinking?	☐	☐
4. Have you ever taken a drink the first thing in the morning (Eye opener) to steady your nerves or to get rid of your hangover?	☐	☐
Total	___	___

(two "YES" responses represent a possibility of problem drinking behavior)



AUDIT-C

Please circle the answer that is correct for you.

1. How often do you have a drink containing alcohol?					**SCORE**
Never (0)	Monthly or less (1)	Two to four times a month (2)	Two to three times per week (3)	Four or more times a week (4)	______
2. How many drinks containing alcohol do you have on a typical day when you are drinking?					
1 or 2 (0)	3 or 4 (1)	5 or 6 (2)	7 to 9 (3)	10 or more (4)	______
3. How often do you have six or more drinks on one occasion?					
Never (0)	Less than Monthly (1)	Monthly (2)	Two to three times per week (3)	Four or more times a week (4)	______
TOTAL SCORE Add the number for each question to get your total score.					______

Maximum score is 12. A score of ≥ 4 identifies 86% of men who report drinking above recommended levels or meets criteria for alcohol use disorders. A score of > 2 identifies 84% of women who report hazardous drinking or alcohol use disorders.

Ep. 134: Rapid Review Series 12 (IM / Cardiology)

ep 134 notes were graciously provided by Divine Intervention from an anonymous contributor.

Recent MI

- Pt with **recent MI** + **12h later becomes suddenly unresponsive then die**s. Cause of death? **Vfib**
  - **VFib = MCC death in first 24h after MI**

  - Tx: chest compressions, defibrillation, epinephrine + amiodarone (see ACLS podcast)
    - Epinephrine: used to tx arrhythmias, and anaphylactic shock
    - **Note**: Defibrillation aka unsynchronized cardioversion is only used in 2 arrhythmias, i.e. Vfib and Pulseless VTachycardia
- Pt with recent MI + bilateral crackles + profoundly hypotensive. Dx? ***Cardiogenic shock***
  - MI = death of cardiac myocytes --> inadequate contractility
  - Left ventricle heart volume is high bc it can't pump blood out
  - What are the hemodynamic parameters for cardiogenic shock?

LV End-Diastolic Volume	increased
LV End-Diastolic Pressure	increased
Stroke volume	decreased
LV End-systolic volume	increased
SBP	Decreased
CO	Decreased
LA pressure (surrogate for PCWP)	Increased
SVR	Increased
CV pressure (surrogate for RA)	Increased

    - Note: **cardiogenic shock leads to pulmonary edema**
      - In contrast: *ARDS* (increased pulmonary permeability): has normal PCWP (< 18 mmHg)

- Pt with **recent MI** + ***flash mitral regurgitation*** d/t papillary muscle rupture --> florid backflow of blood

- Pt with **recent MI** + holosystolic murmur @ LLSB: ***intraventricular septal rupture***

- Pt with **recent MI** + severe abdominal pain: ***acute mesenteric ischemia***
  - "heart is quivering and not contracting appropriately, causing/flicking off a clot"
  - Vs *chronic mesenteric ischemia*: pain after eating, "angina of the bowel"

- Pt with **recent MI** + severe leg pain: ***acute limb ischemia***
  - Vs chronic = peripheral arterial disease

- Pt with **recent MI** a few days ago, BP 80/50, JVD, tall + tiny QRS (Beck's triad): ***ventricular free wall rupture***
  - Blood pools in pericardial space causing cardiac tamponade
    - Sx: distant heart sounds, electrical alternans (heart "dancing" in some kind of fluid -- recorded when comes close to chest wall), low-voltage EKG (also seen in deposition i.e. amyloid)

- Pt with **recent MI** + revascularization, chest pain: reinfarction? --> dx with **CK-MB**

- Pt with **recent MI** + PCI, rising Cr, "blue-toe syndrome", mat-like rash "livedo reticularis" on LE? ***Cholesterol embolization***

- Pt with **recent MI** + few days, chest pain (worse in supine position), scratchy sound in systole + diastole? ***Post-infarction pericarditis***
  - Widespread ST elevation, PR depression

- Pt with **recent MI** + weeks, chest pain, scratchy sound in systole + diastole? ***Dressler's syndrome*** (autoimmune pericarditis)
  - Ddx of pericarditis: recent viral syndrome (MCC), renal failure/uremia, radiation therapy to chest (also a huge RF for thyroid CA!)

- Pt with **recent MI** + chest pain radiating to jaw, nitroglycerin leading to hypotension: ***RCA infarct*** (pre-load dependent!)
    - EKG: II, III, AVF
    - Tx: fluids
- *steroids are not generally helpful in MI bc they prevent wound healing*

Ep. 135: The "Clutch" Electrolytes

ep 135 notes were graciously provided by Divine Intervention from an anonymous contributor.

Calcium

- Hypocalcemia
    - Sx: Chvostek sign @ jaw, Trousseau sign @ upper extremities
- **Hypercalcemia** |-- 1. fluids 2. calcitonin
    - Pathophys: high Ca messes with signaling cascade of ADH --> ~ nephrogenic DI ~ --> low volume
    - @hospital: think about malignancy!
    - @outpt: think about primary hyperparathyroid!
- Pt placed on **ACEi**
    - Sx, dx: high renin, high K, metabolic acidosis
        - ACEi --> decreased conversion of AT1-AT2 --> low aldosterone --> volume down --> positive feedback on RAAS
        - --| Aldosterone --> H+ pump
- **Hypercalcemia**
    - Short QT interval
    - DDx
        - ***Primary hyperparathyroidism***
            - *Parathyroid adenoma*: PTH secretion --> osteoclasts --> reabsorb bone
                - Vs parathyroid hyperplasia (MEN)
            - NBS
                - Check ionized Ca, PTH
                - Tch-99 sestamibi scan
            - Sx/dx
                - High Ca, low PO4 (PTH trashes phosphate)
                - High urine Ca
            - Tx: parathyroidectomy
        - "CHIMPANZEES"
- ***Familial hypocalciuric hypercalcemia***
    - Pathophys: calcium-sensing receptor does not respond to right signals
    - Sx/dx: high PTH, high Ca, low PO4, low urine Ca
        - Receptor does not function well --> reabsorb tons of Ca from urine
    - Tx: benign!
- ***Chronic kidney disease***
    - Pathophys: no activity of 1-alpha-hydroxylase --> impaired conversion of calcidiol to calcitriol (active VitD) --> cannot reabsorb Ca, PO4 in gut
    - Sx
        - High PTH
        - High Ca, high PO4 (cannot excrete through kidneys)

  - Tx: sevalamer = binds PO4
  - What if they get a transplant?
    - Glands of parathyroid undergo hyperplasia due to CKD (they're "always on!") --> no longer response to normal signals -->
    - Sx/dx: high PTH, high Ca, low PO4 (new kidneys) = **tertiary hyperparathyroidism**
      - Bad habits are hard to break. True.
      - Tx: resect 3.5 parathyroid glands, re-implant 0.5 gland; **cinacalcet** (if poor sgy candidate)
- ***Chronic liver disease***
  - Pathophys: no calcidiol (comes from the liver) --> decreased calcitriol --> cannot reabsorb Ca, PO4
  - Sx/dx
    - High PTH
    - High Ca, low PO4 (kidneys are still functioning!)
- AA with bilateral hilar adenopathy: ***sarcoidosis***
  - Pathophys: noncaseating granulomas --> 1-alpha-hydroxylase --> calcidiol conversion to calcitriol --> reabsorption in gut --> high Ca --> low PTH
- Heavy smoker, cavitary lesion in lungs, hypercalcemia: ***lung squamous cell carcinoma***
  - Pathophys: paraneoplastic **PTHrP** --> high PTH --> high Ca, low PO4 --> low PTH
  - Sx: central mass, cavitary lesions
  - Dx: "keratin pearls" on histology
- H/o MEN syndrome, diarrhea, prolonged QT interval: ***MEN2B***
  - Sx: *medullary thyroid cancer,* Marfanoid habitus, mucosal neuromas, pheochromo
    - Vs, MEN2A primary hyperparathyroid, pheo, MTC
    - Vs. MEN1 primary hyperpara, pituitary adenoma, pancreatic neuroendocrine (*VIPoma, insulinoma, glucagonoma, gastrinoma*)
      - Tx: insulinoma - **diazoxide** (open K channels to prevent insulin secretion)
  - Dx: calcitonin --> tones down calcium! Low Ca
  - Ppx: resect thyroids
- Large volume blood transfusion, carpopedal spasms, seizures: **EDTA**
  - = ~anticoag that chelates Ca --> hypocalcemia
  - Sx: dilutional thrombocytopenia --> bleeding
  - Tx: **calcium gluconate**
    - Also used for hypermagnesemia (i.e. PEC), hyperkalemia
- ***Rhabdomyolysis***
  - Sx/dx: low Ca
    - Necrosed skeletal muscle fibers sequester Ca
- ***Pancreatitis***
  - Sx/dx: low Ca
    - Saponification reaction by fatty acids
- Infants of diabetic mothers
  - Sx/dx: low Ca, low glucose
- Congenital heart disease, hypocalcemia: ***diGeorge syndrome***
  - Pathophys: failure of 3rd/4th pharyngeal pouches
  - Sx: low Ca, recurrent infections, hypocalcemic seizures
- ***Hypervitaminosis D***
  - Sx/dx: high Ca, variable PO4, low PTH
    - Increased reabsorption of Ca, PO4 in gut
- Hypercalcemia of malignancy
  - Tx: biphosphonates
- ***Multiple myeloma*** --> hypercalcemia
  - Pathophys: plasma cells secrete IL-1 (osteoclast-activating factor) --> reabsorbs bone --> high Ca

- **Mg** x Ca
  - High Mg --| PTH --> low Ca
  - Low Mg --> PTH --> high Ca
  - Very low Mg --| PTH --> low Ca
    - Won't respond to Ca (or K) depletion w/o Mg repletion!
- **Thiazide diuretics**
  - Sx/dx: high Ca, low urine Ca
  - Pathophys: --| Na/Ca exchanger @ DCT
    - Good for kidney stones, osteoporosis!
- **Loop diuretics**
  - Sx/Dx: low Ca, high urine Ca
  - Pathophys: --| NKCC transporter @loop of Henle --> no extrusion of K --> no reabsorption of Ca
  - C/i: kidney stones
- Nephrotic syndrome, *Menetrier's disease* (protein-losing gastropathy): low albumin --> low Ca, normal ionized Ca

Zinc

- Low zinc
  - Sx: impaired taste, impaired wound healing, loss of hair
  - DDx
    - Nutritional
    - **Trientene** = zinc chelator
      - @ Wilson's dz tx

Magnesium

- Low Mg
  - Sx/dx: prolonged QT interval
    - "hypo___" causes prolonged QT interval!
  - DDx
    - Alcoholics: hypomagnesemia, folate deficiency, B1/thiamine deficiency
    - Refeeding syndrome
      - *Hypophosphatemia is the killer in refeeding syndrome!
  - Tx: Mg
- High Mg
  - Sx/dx: 1. decreased DTR 2. respiratory depression 3. CV collapse
  - DDx
    - PEC with Mg infusion
  - Tx: calcium gluconate
- Tx for premature labor, preterm infant

Potassium

1. Hypoperfusion @ JG cells
2. Renin released
3. AT1 converted to AT2 @ ACE receptor in lung capillaries
4. AT2
   a. Vasoconstrictor @ type1 receptors
   b. Stimulates production of aldosterone from zona glomerulosa
   c. Stimulates release of ADH from supraoptic nucleus of hypothalamus
   d. Efferent arteriolar constriction to maintain GFR

- Low K

  - Sx: flat T waves, U waves, prolonged QT interval
  - DDx: anything that increases RAAS activity!
    - Hypovolemic
      - Pathophys: decreased perfusion of afferent arteriole --> JG cells see this --> renin --> AT1 --> AT2 --> aldosterone --> principal cell of collecting duct --> reabsorb Na, dump K
    - ***Conn syndrome***
      - Sx: resistant hypertension, metabolic alkalosis
      - Pathophys: adrenal adenoma making aldosterone --> reabsorb Na, waste H, waste K --> volume expansion, metabolic alkalosis
        - Hyperperfusion --| renin
      - Dx: increased plasma aldosterone:renin ratio
        - Vs: *renal artery stenosis/FMD*/NSAID = hypoperfusion of afferent arteriole --> RAAS --> low K, high Na, metabolic alkalosis, normal aldosterone:renin ratio
    - **Diuretic** --> decreased volume --> hypoperfusion --> RAAS
      - Sx/dx: low K, metabolic alkalosis (proton pumps @ alpha-intercalated cells)
    - *low K does not always mean alkalosis -- see below!
    - **Acetazolamide, dorzalamide**
      - Pathophys: --| carbonic anhydrase --| reabsorption of HCO3 --> dumping HCO3 in urine, water follows --> non-anion gap metabolic acidosis (Type 2 RTA) with volume depletion/diuresis --> RAAS
      - Sx/dx: low K, metabolic acidosis, volume depletion
      - Uses
        - Volume overload
        - Central sleep apnea: encourages ventilation
        - Idiopathic intracranial hypertension/pseudotumor cerebri: inhibition of CSF production
        - Glaucoma: inhibition of aqueous humor production
        - Altitude sickness
    - **Hyperventilation**
      - Pathophys: respiratory alkalosis -->
        - pulls H+ from cells --> potassium enters cells
        - Binds up positive charges in the body i.e. Ca --> low Ca
- High K
  - Sx:
    - peaked T waves
    - widened QRS
      - Can also be caused by TCA!
    - sinusoidal EKG
    - flat line/asystole
    - death
  - Tx:
    - calcium gluconate
    - insulin (activate Na/K pump) + glucose
    - albuterol/beta agonist (activate Na/K pump)
    - sodium bicarb (induce alkalosis)
    - **kayexalate**, loop diuretic
  - ***Addison's disease***
    - Sx: orthostatic hypotension for a while, low Na, high K, non anion-gap metabolic acidosis (Type IV RTA, positive urine AG), eosinophilia
      - Vs. diarrhea non anion-gap: urine AG (negative/"neGUTive")
    - Pathophys: autoimmune destruction of adrenal glands

            - Decreased perfusion --> RAAS --X--> cannot produce aldosterone --| reabsorption of Na …
    - ***Rhabdomyolysis***
        Pathophys: muscle cells are dying --> release of K
        Ppx: telemetry to track fatal arrythmia
        Tx: hydration, monitor EKG
    - ***Tumor lysis syndrome***
        Pathophys: lymphoma/leukemia cells dying --> release of K
    - Potassium sparing diuretics
        spironolactone/eplerenone (--| aldosterone receptor)
        amiloride/triamterene (--| ENAC)
        - Can treat nephrogenic DI 2/2 lithium

Sodium

- Low Na
    - Serum osmolarity = 2(Na) + glucose/18 + BUN/2.8
        - ^Na is the greatest contributor
    - + Low serum osmolarity (280-290)
        - + Low volume
            - DDx:
                - diuretics (--| NKCC, losing more Na than water bc of power of diuretic)
                    - Forcing a kidney to work outside its normal physiology! High urine Na
                - vomiting (loss of electrolyte-rich fluid)
                    - Low volume --> RAAS --> reabsorb Na, low urine Na
            - Tx: fluids
        - + Normal volume
            - DDx:
                - Small-cell lung cancer: ***SIADH***
                    - Also seen with early gen sulfonylurea, clozapine, SSRI
                    - ADH --> keep reabsorbing water in the blood --> low serum osmolarity, high urine osmolarity
                    - Tx: fluid restriction, ADH antagonist (-vaptan)
                - *Hypothyroidism*
                - ***Psychogenic polydipsia***
                    - Also seen in MDMA
                    - Excess water intake --> dilution of plasma --> low osmolarity --> decreased ADH --> pee out all the water you just drank --> low serum osmolarity, low urine osmolarity
                4. Tea and toast diet
        - + High volume
            - DDx: cirrhosis, nephrotic syndrome, renal failure
                - Low oncotic pressure --> not much fluid in vasculature --> not perfusing vasculature -->--> RAAS
            - DDx: CHF
                - Effective blood volume is low i.e. not perfusing kidneys well (cannot pump forward) --> RAAS
                    - High aldosterone: increase Na + H2O
                    - High ADH: increase H2O
                    - Dx: low urine Na (*high urine Na in renal failure) d/ t aldosterone
                    - Tx: restrict fluid
- High Na

        - DDx: diabetes insipidus
            - Not enough ADH activity! Cannot retain water --> peeing out a ton --> high serum osmolarity, low urine osmolarity
            - DDx
                - *Central*: closed head injury
                - *Nephrogenic*: lithium, demeclocycline, hypocalcemia
            - Dx:
                - **water deprivation test**
                    - Urine osmolarity goes up: normal
                    - Barely increases: DI!
                - **Desmopressin**
                    - Urine osmolarity goes up? Central DI
                    - Barely increases: nephrogenic DI
                    - Also used for: central DI, vWD (increased release of vWF from WP bodies), mild hemophilia A, nocturnal enuresis, kidney-assoc coagulopathy (uremia prevents degranulation of platelets))
                        - Vs. coagulopathy of liver disease (tx: FFP)
                        - Ae: hyponatremic seizure
        - Tx:
            - Normal saline
            - D5W
    - High --> low: cerebral edema!
        - *Think about this in overtly rapid correction of glucose in DKA, HHNK
    - Low --> high: pons will die!

Ep. 137: “Next Best Step In Management” Series 1

- 55 yo M with unilateral vision loss, sxs resolved within 5 mins → TIA
    - NBSDx? Carotid ultrasound
    - NBSM? Antiplatelet agent (e.g. aspirin, clopidogrel)
        - NOT anticoagulant unless obviously has A-fib
- 55 yo M with WHOL, started 30 mins ago + nuchal rigidity + fever 100.9F → SAH
    - NBSDx? NCCT
        - If negative, do LP → xanthochromia
    - NBSM?
        - Labetalol (control BP)
        - Nimodipine (prevent ischemic stroke)
- 50 yo F with unilateral HA + pain with chewing 2 weeks ago → temporal arteritis
    - NBS? High-dose corticosteroids
    - Temporal artery biopsy later
    - Polymyalgia rheumatica
        - Proximal shoulder pain & stiffness
        - NBS? Low-dose corticosteroids

        - Temporal artery biopsy later
- 60 yo M w/ AMS for past 24 hrs + temp 102F + nuchal rigidity → meningitis
    - If signs of elevated ICP → give abx
    - Otherwise, obtain LP then immediately afterward give abx
    - Antibiotics:
        - Neonate or over 50 → ceftriaxone + vancomycin + ampicillin
        - Otherwise → ceftriaxone + vancomycin
- Red, hot, swollen, painful knee + temp 102F → possible septic joint
    - NBS? Arthrocentesis
        - <2k WBC → OA
        - 2-50k → RA
        - >50k → septic arthritis
            - Potentially crystalline arthropathy
        - Yellow needle-shaped, negatively birefringent crystals → gout
        - Blue rhomboid, positively birefringent crystals → CPPD
- Lifelong smoker + 40 lbs weight loss + nodule in LUL on CXR + large L-sided pleural effusion → lung cancer
    - NBS? Thoracentesis
    - Malignant cells in pleural fluid → stage 4 → not surgical candidate
- Alcoholic M with AMS for past few days + spider angiomas/gynecomastia + asterixis + fever 100.9F + mild diffuse abdominal tenderness + shifting dullness & fluid wave → SBP
    - NBS? paracentesis
        - >250 PMNs → SBP
    - Tx? Ceftriaxone (+ FQ prophylaxis after recovered)
    - Associations?
        - Peritoneal dialysis
        - VP shunts
        - Budd Chiari syndrome
- 50 yo M with MI 3 days ago or hx A-fib + severe, sudden onset leg pain + cold, mottled leg → ALI
    - NBS?
        - 1st: IV heparin
        - 2nd? Vascular surgery consultation
- 50 yo M with MI 3 days ago or hx A-fib + severe abdominal pain → acute mesenteric ischemia
    - NBS? Angiography to find vessel
        - Most likely vessel? SMA
- Lifelong smoker with severe bilateral leg pain → peripheral arterial disease
    - NBS? ABI
        - **< 0.9 → PAD**
        - 0.9-1.0 → borderline
        - 1-1.4 → normal
        - **> 1.4 → Mönckeberg medial calcific sclerosis**
            - **NBS for ABI > 1.4? Toe-brachial index**
    - Tx?
        - **1st**: Supervised walking program
        - **2nd**: Cilostazol (PDE inhibitor, helps improve sxs)

        - **3rd**: Bypass
            - But arteriography first!
    - **Note**: PAD causes **painful** ulcers on the **tips** of digits + cool pale skin with dermal atropy + decreased pulses!
- Pt with hx hearing voices + multiple hospitalizations + improves on antipsychotics in hospital, then stops taking them → schizophrenia
    - NBSIM? Monthly haloperidol decanoate injections
- Pt on antipsychotic with head "stuck" → acute dystonia
    - NBS? Give diphenhydramine or benztropine
- Pt on antipsychotic feeling restless, pacing in exam room → akathisia
    - NBS?
        - 1st line: beta blocker
        - 2nd line: benzodiazepine
- Pt with hx schizophrenia with resting tremor + bradykinesia → parkinsonian
    - NBS?
        - 1st line: benztropine or trihexyphenidyl
        - 2nd line: dopamine agonists
- Pt been on antipsychotic for a while, now with weird tongue movements → tardive dyskinesia
    - NBS? Stop drug
        - Switch to atypical antipsychotic

- 35 yo F with BMI 40 with morning HAs + blurry vision for last 3 weeks → IIH
    - NBS? LP
    - Tx?
        - Acetazolamide
        - serial therapeutic LPs
    - Stop potential offending meds
        - Vit A analogs
        - Doxycycline
- 35 yo M with daily pulsatile headaches for past 3 months, feels better resting in dark room → migraines
    - NBS? Chronic migraine medication
        - Beta blockers
        - Topiramate
            - Adverse effect? nephrolithiasis
        - TCA
            - Signs of toxicity? Wide QRS
- 35 yo M hx of migraines, having severe HA right now
    - NBS? Abortive therapy
        - Sumatriptan
        - Ergo derivative
- 35 yo M with severe unilateral headache + rhinorrhea + conjunctival injection → cluster HAs
    - NBS? 100% O2
- 30 yo M hx of tx-resistance schizophrenia, started on new med 2 weeks ago, over last 24 hrs has had fever to 103F + WBC 2k with 20% neutrophils → neutropenic fever 2/2 agranulocytosis 2/2 clozapine tx
    - NBS? Stop clozapine

  - Tx?
    - Antipseudomonal agent: e.g. meropenem, imipenem
  - Similar presentation to pt on chemo or pt with Graves' on methimazole
- Lifelong smoker presents with 7 days of SOB + increased sputum production → COPD exacerbation
  - NBS? IV corticosteroids + bronchodilators (e.g. Duoneb) + azithromycin
    - Azithromycin is used for its anti-inflammatory properties
- 60 yo M with hx AR presents with 3 days of profound SOB + orthopnea + S3 heart sound → CHF exacerbation
  - NBS? IV furosemide (loop diuretic)
    - Can also gives nitrates to relieve dyspnea 2/2 pulmonary edema
- Pt with terminal cancer with dyspnea
  - NBS? Morphine
- 75 yo M lifelong smoker presents with 6 weeks of joint pain (fingers, legs) not improved with NSAIDs + finger clubbing on exam → Hypertrophic pulmonary osteopathy
  - NBS? CXR
- 57 yo F with insomnia due to "crawling sensation in leg" → restless leg syndrome
  - NBS? Dopamine agonist (e.g. pramipexol, ropinirole)
    - Alternatively, primidone
  - Association? IDA
- 30 yo M with 6 months of diffuse worries → GAD
  - NBS? Consider SSRI or buspirone (partial serotonin receptor agonist)
- 25 yo F with hx depression + placed on SSRI/SNRI 4 weeks ago + want to stop drug due to sexual side effects
  - NBS? Switch to bupropion (no sexual side effects)
    - Other indications: smoking cessation, weight loss
    - Contraindication: anorexia & bulimia, hx seizures
- 50 yo F with 2 months of guilt + loss of interest + hypersomnia + low energy + HR 49 → pseudodepression 2/2 hypothyroidism
  - NBS? TSH
- 45 yo M with 2 weeks palpitations + 10 lb weight loss + BP 180/90 + HR 190, then suddenly becomes somnolent → thyroid storm
  - NBS? Propranolol then PTU then Lugol's solution (supersaturated solution of KI)
- 75 yo M over past year forgets to turn off stove, forgets longtime friends → Alzheimer's disease
  - NBS? Brain MRI
  - Tx? AChE inhibitor
    - Donapozel
    - Galamine
    - Rivastigmine
- 35 yo M alcoholic presents with 2 days severe mid abdominal pain, radiates to back → alcoholic pancreatitis
  - NBS? IVF & NPO
  - DX? Lipase (more specific than amylase)
- 40 yo F with Grave's on methimazole presents with 2 hrs palpitations + HR 220 + pulse irregular, then appears confused & BP drops 70/40 → A-fib with RVR, now HDUS
  - NBS? Synchronized cardioversion = DC cardioversion

        - Because pt is hemodynamically unstable
    - What if the patient was HDS?
        - Beta blocker
        - CCB (verapamil, diltiazem)
            - Verapamil associated with hyperprolactinemia
    - Rate control strategy: beta blocker, non-dihydropyridine CCB, digoxin
    - Rhythm controls strategy: amiodarone
- 25 yo M with palpitations + HR 250 + irregularly irregular + hx WPW
    - NBS? Procainamide
        - Do NOT use AV nodal blocking agent (BB, CCB, digoxin, adenosine) because this enhances use of accessory tract → V-fib likely
- 30 yo F presents with 3 months severe abdominal pain + globular, boggy uterus → adenomyosis
    - NBS? Hormonal IUD
- 40 yo F presents with 3 months severe abdominal pain + globular, boggy uterus, doesn't want any more children, fed up with pain → adenomyosis
    - NBS? Hysterectomy
    - Dx? Uterine MRI
    - Gold-standard test for adenomyosis? Diagnostic laparoscopy
- 45 yo F with BMI 40 + severe pain RUQ + temp 101F + WBC 12k?
    - NBS? RUQUS
        - If equivocal → HIDA scan
            - "Non-visualization of GB after 4 hrs" = positive for cholecystitis
    - Tx? Proceed with cholecystectomy
- Pt severely ill in hospital for 2 weeks now with RUQ pain + fever + leukocytosis + RUQUS showing GB wall thickening & pericholecystic fluid but NO cystic duct dilation or obstructing stones → acalculous cholecystitis
    - NBSM? Percutaneous cholecystostomy
        - Do NOT perform cholecystectomy (high mortality!)
- 17 yo M with BMI = 40 with morning HAs + RR 8 + PCO2 60 → OSA/OHS
    - NBS? Polysomnogram
- 6 month old with 2 weeks of frequent GTCs + hypopigmented macules on exam
    - NBSM? ACTH
        - Alternative = vigabatrin
    - EEG findings? Hypsarrhythmia
    - Association? Tuberous sclerosis
- 33 yo M with BMI = 18 with 3 days of severe blood diarrhea + severe distention, rebound, guarding on exam → toxic megacolon 2/2 UC
    - NBS? Ex-lap
- Ex-lap is NBSM
    - Toxic megacolon (2/2 C. diff, UC, Chagas)
    - Penetrating trauma to abdomen
    - Free air under diaphragm
- Nurse stuck by needle from Hep B positive pt, had Hep B vaccine 2 years ago with confirmed immunity
    - NBS? No further action
    - If non-immune? Hep B vaccine + Hep B immune globulin

- HIV pt on HAART, CD4 = 600
    - NBS?
        - In fall, give influenza vaccine
        - Pneumococcal vaccine
            - Adults <65 yo if smoker, CKD, DM, or immunocompromised
            - All adults >65 yo
- 22 yo G2P1 F at 18 weeks, has elevated AFP, decides to undergo amniocentesis
    - NBS? Give Rhogam
- 37 yo F with 3 months of heavy menstrual bleeding, BMI = 35, menses every 70 days
    - NBS? OCPs
    - Endometrial biopsy may also be the right choice due to high risk of endometrial hyperplasia/carcinoma
- 25 yo M with high # partners and inconsistent use of condoms. Painless lesion with heaped up borders on penis
    - NBS? RPR or VDRL
    - After RPR/VDRL, do a treponemal test (e.g. FTA Abs)
    - Tx? Penicillin G
- 35 yo M going for eye surgery, 20 minutes after induction has stiffness in extremities and fever 105F → malignant hyperthermia
    - Pathophys? Abnormal ryanodine receptors permits tons of Ca++ to be released from SR → muscle contraction
    - NBS? Administer dantrolene
        - Blocks ryanodine receptor (which is a Ca++ channel that enables Ca++ release from the sarcoplasmic reticulum)
    - Inheritance? AD
    - Gene? Ryanodine receptor gene

Ep. 138: The "Clutch" Genetic Disease

ep 138 notes were graciously provided by Divine Intervention from an anonymous contributor.

Chromosomal/trisomy

- Newborn w/ flat face, epicanthal folds, Brushfield spots on iris, single palmar crease: ***Down syndrome***
    - Et: Trisomy **21**
    - Pathophys:
        1. Maternal nondisjunction (MCC)
        2. Robertsonian translocation = 1 part of one chromosome goes to another --> teeny-tiny chromosome + big boy chromosome
    - Dx: elevated bHCG + inhibin, low AFP + estriol, karyotyping
    - Sx (mostly from neural crest issues):
        - Endocardial cushion defects w septa + valves --> atria and ventricles not separated properly
        - *Duodenal atresia* --| recanalization

        - Vs. jejunal atresia d/t vascular insult in utero
    - *Hirschsprung disease* --| Auerbach/Meissner plexi
        - Sx: meconium ileus
    - C/b *ALL, Alzheimers* (amyloid-precursor protein on chr21)
  - RF: advanced maternal age = less eggs to fertilize, higher likelihood of fertilizing nondisjunction egg
- Second most common trisomy: ***Edwards Syndrome***
  - Et: Trisomy **eighteen**
  - RF: advanced maternal age
  - Sx: prominent occiput, micrognathia, overlapping digits, rocker-bottom feet, death by age1-2
- Least common trisomy: ***Patau syndrome***
  - Et: Trisomy **13**
  - RF: advanced maternal age
  - Sx: microcephaly, micropthalmia, holoprosencephaly, multiple digits, cleft lip/palate, rocker-bottom feet, death <1Y
- Cat-like cry: ***cri-du-chat syndrome***
  - Et: chr**5** defect
  - Sx: microcephaly, high-pitched cat-like cry
- 6mo losing motor milestones, fasciculations: ***spinomuscular atrophy***
  - Et: chr**5** @ **SMR1** gene
  - Pathophys: destruction of anterior horn cells in spinal cord
- White reflex/leukocoria: ***retinoblastoma***
  - Et: chr**15** Rb tumor suppressor deletion
  - C/b osteosarcoma
- Visual problems (no iris), flank mass, posterior urethral valves, ID: ***WAGR***
  - Sx: Wilms tumor + aniridia + genitourinary + mental retardation
  - Et: chr**11** gene deletion
- ***Beckwith-Wiedemann Syndrome***
  - Sx: Wilms tumor, macroglossia, hemihypertrophy, hepatoblastoma
    - Seizures at birth d/t hypoglycemia <-- overgrowth of pancreatic islet beta cells (insulin)
- 25M infertility, 6', breast tissue, micropenis: ***Klinefelter syndrome***
  - Et: **47XXY**
  - Pathophys: gonads do not work --> no inhibition @ pituitary --> elevated FSH/LH (*hypergonadotropic hypogonadism*)
  - Sx: no sperm, female distribution of hair
- Female w short stature, short posterior hairline: ***Turner Syndrome***
  - Et: **45XO**
  - Pathophys: second X chromosome is necessary for forming ovaries! Therefore they have streak ovaries --> no estrogen --> defect in secondary sexual characteristics
  - Sx:
    - cubitus valgus (elbow turned inward)
    - short stature,
    - low posterior hairline
    - congenital lymphedema (cystic hygromas, webbed neck)
    - primary amenorrhea
    - coarctation of the aorta
      - Delayed radial-femoral pulse
      - d/t stenosis past the subclavian
    - Bicuspid aortic valve --> early onset aortic stenosis
      - *MCC of aortic stenosis <70Y! (afterwards: senile calcification)
    - Horseshoe kidney

- Later in life, abdominal mass: streak ovary --> *gonadoblastoma*
- *hypergonadotropic hypogonadism*
  - Vs: athlete that works out a ton --> shut down HPG axis --> *hypogonadotropic hypogonadism*
  - Vs. Hypothyroidism --> elevated TSH --> prolactin --| GnRH, FSH, LH
  - Vs. Kallmann syndrome --| GnRH cells
- Genomic imprinting disorders or uniparental disomy
  - Obesity, hypotonia, deletion of paternal chr15: ***Prader-Willi***
  - Inappropriate laughter, deletion of maternal chr15: ***Angelman***

Autosomal recessive: enzyme defects, earlier sx, need 2 bad copies of allele

- 5th percentile weight, 10th percentile weight, recurrent infections: ***cystic fibrosis***
  - Et: chr**7 deltaF508** @ **CFTR** channel
  - Pathophys: Cl does not leave the cell --> attracts extracellular sodium --> water follows --> thick secretions of exocrine, sweat glands
  - Sx:
    - Pancreas: fat malabsorption ADEK (night blindness, secondary hyperpara, cerebellar ataxia, acanthocytosis, bleeding),
    - Recurrent sinus infections d/t impaired mucus clearance
    - Inflammatory response --> "cystic" dilation of airways = *bronchiectasis* + fibrotic damage
    - Pneumonia 1) **Staph aureus** 2) **Pseudomonas**
      - **Burkholderia cepacia** --> TERRIBLE pulm infection --> sudden death 2/2 pneumonia
    - Plugging of seminiferous tubules, agenesis of vas deferens --> infertility
    - Meconium ileus
    - Secondary primary biliary cholangitis d/t thick secretions of bile canaliculi
  - Tx: Ivacaftor
  - Dx: sweat chloride test, conductance of nasal epithelium, low serum trypsinogen (pancreas), DNA testing
- Child w/ musty odor, ID: ***phenylketonuria***
  - Et: deficiency of **phenylalanine hydroxylase**
    - BH4 cofactor; mutation in **tetrahydropterine reductase** could cause similar sx
  - Pathophys: buildup of **phenylalanine**
  - Sx
    - Toxicity @ neurons
    - Musty odor (phenyl = benzene ring = aromatic compound)
    - Albinism d/t deficiency of tyrosine (--> melanin)
  - Tx: no phenylalanine in diet, avoid aspartame (artificial sweeteners)
  - Dx: newborn screen
  - Ppx: mom has PKU --> needs to be placed on careful diet during pregnancy; phenylalanine can cross placenta --> sx in baby
- 25Y, osteoarthritis, black joints on synovial analysis, discoloration of ears/nose: ***alkaptonuria/ochronosis***
  - Et: deficiency of **homogentisic acid oxidase**
  - Sx: "cartilage fetish"
- ***Albinism***
  - Et: deficiency in **tyrosinase**
    - tyrosine -~~-tyrosinase~~--> melanin
  - Sx: oculocutaneous albinism
  - C/b *basal cell/squamous cell carcinoma* (melanin helps absorb some of the bad UV)
- Cherry-red spot on macula, loss of motor milestones, no HSM: ***Tay-Sachs disease***
  - Lysosome = "waste basket of the cell"
  - Et: deficiency of **hexosaminidase A** --> buildup of **GM2 ganglioside** (@CNS)

    - Sx: hyperreflexia, ID, cherry-red (ganglion cells in retina enlarge, engorge/compress blood vessels), death <2Y
    - RF: Ashkenazi-Jewish heritage
- ***Niemann-Pick Disease***
    - Et: deficiency of **sphingomyelinase** --> buildup of **sphingomyelin** in macrophages (@ reticuloendothelial system = liver, spleen, bone marrow + @CNS)
    - Sx: cherry-red spot on macula, hyperreflexia, ID, hepatosplenomegaly (c/b thrombocytopenia)
- Pancytopenia, macrophages on bone marrow biopsy w/ crumpled paper appearance: ***Gaucher disease***
    - Et: deficiency of **glucocerebrosidase** @ macrophages in reticuloendothelial system
    - Sx: ineffective erythropoiesis, joint problems ^^^
- Corneal clouding, coarse facial features: Hurler syndrome
    - Et: mutation in **alpha-L-iduronidase -->** buildup of heparin + dermatan sulfate
    - Sx:
    - Vs. Hunter syndrome (X-linked recessive): mutation in **alpha-iduronate sulfatase**
        - Pathophys: buildup of heparin + dermatan sulfate
        - Sx: no corneal clouding or coarse facial features
- ***Von Gierke disease*** (Type 1 GSD)
    - Et: deficiency of **glucose-6-phosphatase** (glycogen-->glucose) --> buildup of G6P in liver
        - --> hepatic cells expand, explode!
    - Sx: hypoglycemia between meals d/t lack of gluconeogenesis
- ***Pompe disease*** (Type 2 GSD)
    - Et: deficiency of **alpha-1,4-glucosidase/acid maltase**
    - Sx: heart failure
- ***Cori disease*** (Type 3 GSD)
    - Et: deficiency of **debranching enzyme/alpha-1,6-glucosidase** (@muscle, liver)
    - Sx: hepatosplenomegaly, muscle sx
- ***McArdle's disease*** (Type 5 GSD)
    - Et: deficiency of **glycogen (myo)phosphorylase** @muscle
    - Sx: muscle cramping w/ exercise
- ***I-cell disease***: --| phosphotransferase --> cannot put mannose-phosphate on things, so things are improperly transported
- FA oxidation disorders
    - Medium chain, long chain FA: metabolized @ mitochondria
        - ***MCAD/LCAD*** --| beta-oxidation --> impaired FA oxidation --> elevated acylcarnitine
            - Vs. ***carnitine deficiency***: low acylcarnitine
    - Very long chains: metabolized @ peroxisome
        - ***Adrenoleukodystrophy***: demyelination, cerebellar ataxia, death <2Y
- ***Hemophilia C*** --| Factor 11
- African missionary with oxidizing drug --> hemolytic anemia: ***G6PD***
    - Sx: heinz bodies, bite cells
    - Dx: G6PD assay weeks after ep

X-linked recessive (sx @ boys)

- Immunodeficiencies!
    - Recurrent infections, hypopigmented skin (eczema), low platelets: ***Wiskott Aldrich syndrome***
    - ***Chronic Granulomatous Disease***
        - Et: deficiency in NADPH oxidase
        - Sx: recurrent infections w Staph aureus (abscesses)
        - Dx: tetrazolium, dihydrorhodamine test
        - Tx: **interferon-gamma**

            - Vs.
                - Interferon alpha --| HepC
                - Interferon beta --| MS
    - Kiddo w/ gout, chews off fingers/toes: ***Lesch-Nyhan syndrome***
        - Et: deficiency of **HGPRT** (purine salvage pathway)
        - Sx: hyperuricemia --> toxicity @ neurons, self-mutilation
    - ***Bruton's agammaglobulinemia***
        - Et: mutation in Bruton's tyrosine kinase (B-cells)
        - Sx: small tonsils, bacterial infections
        - Tx: IVIG
- ***Hemophilia A*** --| Factor 8
    - Sx: elevated PTT
    - Dx: correct w mixing studies (but sometime create Ab-factor8)
- ***Hemophilia B*** --| Factor 9
    - Sx: elevated PTT
    - Dx: correct w mixing studies (but sometime create Ab-factor9)
- ***Meinke's disease/kinky hair disease***
    - Et: **ATP7A** mutation (copper metabolism)
        - Vs. ATP7B Wilson's disease (copper @ basal ganglia, liver dz, psych, Kayser, c/I copper IUD, tx penicillamine/trientine)
            - *penicillamine/trientine = chelators; ae: zinc deficiency (also chelated)
    - Sx: death <2Y

Autosomal dominant: structural protein or receptor defect, later sx

- If two copies of bad dominant allele: death in utero i.e. lethal form of *osteogenesis imperfecta*
- 19Y, father died from MI @30Y, severe chest pain, STEMI, xanthelasma/xanthomas: ***familial hypercholesterolemia***
    - Et: mutation in **LDL receptor** --> will not clear cholesterol
        - ***Type 1***: No LDL receptor
        - ***Type 2***: LDL receptors do not reach surface of the cell (--| exocytosis pathway)
        - **Type 3**: LDL has trouble binding to LDL receptor; MCC
        - **Type 4**: LDL binds to LDL receptor but not endocytosed
        - **Type 5**: --| recycling LDL receptor
    - Sx: accelerated atherosclerotic dz
    - Tx: statin, PCSK9 inhibitors (-cumab)
- 6'5", hyperextensible joints, displacement of lens, tearing chest pain radiating to back: ***Marfan's syndrome***
    - Et: mutation on chr**15 fibrillin gene/FBN1** (maintains integrity of elastic fibers)
    - Sx:
        - Mitral valve prolapse/myxomatous degeneration
        - Impaired elasticity of arteries (@intima) --> dilation without collapse --> aneurysm --> *ascending aortic dissection* (highest pressure vs. abdominal aorta) --> pull leaflets apart --> aortic regurgitation
        - Circle of willis aneurysm --> subarachnoid hemorrhage
        - Lens subluxation/ectopia lentis: up and out

Marfan's syndrome	***Homocystinuria***
Aut dom	Aut rec
Fibrillin mutation	Cystathionine beta-synthase deficiency
Lens up and out	Lens down and out

Normal intelligence	ID
	B6/B9/B12 elevate homocysteine

    - Problems w/ wound healing, hyperextensible joints: ***Ehlers-Danlos syndrome***
        - Et: mutation in **Type 3 collagen**
        - Sx: aortic dissection, thoracic aortic aneurysm, wound dehiscence, rupture of colon (thicker fecal material d/t water absorption --> wall of colon w type3 collagen struggles)
- Kiddo w blue sclera, fractures, short: ***osteogenesis imperfecta***
    - Et: defect in **Type 1 collagen (COL1)**
- Kiddo w hematuria, hearing problems, cataracts: ***Alport syndrome***
    - Et: defect in Type 4 collagen **COL4A5** (@eye, ear, kidney)
        - *X-linked dominant
        - Vs. *Goodpasture syndrome*: Ab-Type4collagen
- Kiddo w short stature, dwarf, problems w long bone growth: ***achondroplasia***
    - Et: mutation in **fibroblast-growth-factor3**
- Café au lait spots, growths on body: ***NF1***
    - Et: chr**17** @ **neurofibromin** = tumor suppressor of p21 (RAS cascade)
    - Sx: neurofibromas, meningiomas, pheochromo, Lisch nodules (hamartomas @ iris)
- ***NF2***
    - Et: chr**22** @ **merlin** = tumor suppressor that tells cells when they're too close (contact inhibition)
    - Sx: bilateral acoustic neuromas
- Posterior fossa mass, hematocrit 60%: ***VHL***
    - Et: chr**3** @ **VHL** gene = ubiquitination of proteins that cause growth/proliferation
    - Sx: hemangioblastoma (esp @cerebellum, inhibited downregulation of HIF1 vascularization), EPO production, cysts @ liver/pancreas, bilateral renal cell carcinoma
- Multiple polyps in colon: ***FAP***
    - Ppx: colonoscopies <20Y
    - + medulloblastoma = *Turcot syndrome*
    - + soft tissue osteoma = *Gardner syndrome*
- Hgb 8, paternal relatives have blood disorders: ***hereditary spherocytosis***
    - Et: mutation in **ankyrin, spectrin, band3.2**
    - Tx: splenectomy
- F with heavy menstrual bleeding: Von Willebrand Disease
    - Et: deficiency of VWF
    - Dx: normal plt, elevated PTT

Trinucleotide repeat

- Autosomal dominant
    - ***Myotonic dystrophy***
        - Et: **CTG** @ **DMPK1**
        - Sx: trouble releasing grip, early balding
    - ***Huntington's***
        - Et: **CAG** @ chr**4**
            - w/ anticipation!
        - Sx: choreiform movements, dementia, inappropriate behavior
            - DDx **choreiform movements**:
                - Huntington's
                - *Sydenham chorea* 2/2 rheumatic fever
                - Lesion @ subthalamic nucleus = contralateral *hemiballismus*

            - *PANDAS* = pediatric autoimmune neuropsych disorder 2/2 GAS
            - Vs. myoclonus
                - *Neuroblastoma* (flank mass, posterior mediastinum, calcified, crosses midline): "opsoclonus-myoclonus syndrome"
                - *Crutzfeld-Jakob disease*: elevated 14-3-3, prion
                - *Serotonin syndrome*
        - Tx: haloperidol, tetrabenazine
- X-linked dominant (only 2 = Fragile X + Alport!)
    - Big ears, testicles, long face, ADHD/autism: ***Fragile X syndrome***
        - Et: CGG repeat
- Autosomal recessive
    - ***Friedrich ataxia***
        - Et: GAA repeat

Mitochondrial disorders: from mom!

- ***Leber optic neuropathy***
- ***MELAS*** = mitochondrial dz "ragged red fibers" --> encephalopathy, lactic acidosis, stroke

Multifactorial inheritance

- Neural tube defects
- Congenital heart disease
- T2DM

Ep. 141: Rapid Review Series 13 (IM)

- 40 yo F, BMI = 40, presents with pain in upper abdomen + fever 102F + positive Murphy's sign → acute cholecystitis
    - Dx? RUQUS w/ GB wall thickening + pericholecystic fluid
        - If negative, HIDA scan
            - Don't see gallbladder at 90 mins → acute cholecystitis
    - Tx? Lap chole
- Pt on TPN or in ICU, RUQUS shows characteristic findings but no stones → acalculous cholecystitis
    - Tx? Percutaneous cholecystostomy
        - Do NOT perform cholecystectomy (increased mortality)
- Pt with stone in cystic duct + dilation of intrahepatic bile ducts → Mirizzi syndrome
- RUQ pain + fever + AMS + scleral icterus + BP 80/48 → ascending cholangitis
    - Charcot triad = RUQ pain, fever, jaundice
    - Reynolds pentad = Charcot triad + AMS + hypotension
    - Dx? ERCP
    - Tx? ERCP + abx
- Pt s/p spleen repair for traumatic injury, now with referred pain to L shoulder & fevers → subphrenic abscess
    - Tx? Drain abscess

- Pt recently treated for acute pancreatitis, isolated gastric varices found on imaging or endoscopy → splenic venous thrombosis
    - Weird thromboses:
        - Renal vein thrombosis
            - Association: nephrotic syndromes (esp membranous nephropathy)
        - Hepatic vein thrombosis = Budd Chiari syndrome
            - Associations: OCPs, polycythemia vera
- Pt with hx OA presenting with epigastric pain → peptic ulcer disease
- Alcoholic pt with pain radiating to back → acute pancreatitis
    - Drug that cause pancreatitis:
        - Didanosine
        - Stavudine
        - GLP-1 agonists (e.g. exenatide, liraglutide)
        - DPP4-inhibitors (e.g. sitagliptin)
    - Associations:
        - Alcoholism
        - Gallstones
        - Sickle cell
        - IgG4-related dz
            - RP fibrosis
            - Pancreas looks like a sausage on imaging
- Periumbilical pain progressing to RLQ → acute appendicitis
- Flank pain radiating to groin + hematuria → nephrolithiasis
- 23 yo F with severe RLQ pain + inconsistent condom use → ectopic pregnancy
- 15 yo F with 5 cm simple ovarian cyst, now with sudden-onset severe abdominal pain → ovarian torsion
    - Contrast with ruptured cyst: will have free fluid in peritoneal cavity on USMLEs
- Cervical motion tenderness + vaginal discharge → PID
    - Fitz-Hugh-Curtis syndrome = involvement of hepatic capsule
    - Bugs? CT & NG
    - Tx? Ceftriaxone + azithro/doxy
    - Don't give IUD recently after PID ep
- 80 yo F with LLQ pain + fever → diverticulitis
    - Dx? CT w/ contrast
    - Colonoscopy weeks later to r/o CRC
- 80 yo F with LLQ pain + pneumaturia or fecal matter in urine → colovesical fistula 2/2 diverticulitis
- Pt on chemo with thickened cecum → typhlitis
    - Pathophys: severe inflammation of cecum (similar to necrotizing enterocolitis)

- MAHA + thrombocytopenia + renal failure → Hemolytic uremic syndrome
    - Bugs? O157H7 E. coli or Shigella
    - Platelet count low
    - Bleeding time high
    - PT/PTT normal
- Hemophilia A/B
    - Platelet count normal

    - Bleeding time normal
    - PT normal
    - PTT high
    - Inheritance? X-linked recessive
    - Factors?
        - Hemophilia A → factor VIII
        - Hemophilia B → factor IX
- Von Willebrand disease
    - Platelet count normal
    - Bleeding time prolonged
    - PT normal
    - PTT high
        - Pathophys: factor VIII is bound to vWF in circulation, vWF helps prevent its degradation
- Risocetin test used to assess 1st step in primary hemostasis (integrity of Gp1b-vWF interaction)
    - Abnormal in VWD & Bernard–Soulier syndrome
- DIC
    - Platelet count low (consumption) → prolonged bleeding time
    - Coagulation factors being consumed → PT & PTT high
- Warfarin
    - Platelet count normal
    - Bleeding time normal
    - PT & PTT both high (affects factors 2, 7, 9 10)
    - Reversal?
        - Vit K
        - Four-factor PCC (prothrombin complex concentrate)
- Heparin
    - Platelet count normal
    - Bleeding time normal
    - PT & PTT both high (affects factors 2 & 10 in common pathway)
    - Reversal? Protamine sulfate
- Aspirin
    - Platelet count normal
    - Bleeding time prolonged
        - Pathophys: irreversibly inhibits COX → impairs platelet function
    - PT & PTT normal
- Liver
    - PT & PTT elevated due low factor production
- Splenomegaly
    - Platelet count low (due to sequestration)

- 45 yo F with hx HIV at annual visit, with bilateral pedal & periorbital edema on exam, decreased breath sounds + dullness to percussion lower lung fields + UA with 4+ protein + CXR with bilateral blunting of costophrenic angles → transudative effusion 2/2 FSGS
    - Pathophys: loss of protein in urine → decreased oncotic pressure → transudative effusions
    - Causes of transudative effusions

        - CHF
        - Cirrhosis (low albumin)
        - Nephrotic syndromes
        - Menetrier disease (protein-losing enteropathy)
        - PE **can cause both
    - Causes of exudative effusions
        - Malignancy
        - PE
    - Light's criteria
        - Pleural protein/serum protein < 0.5
        - Pleural LDH/serum LDH < 0.6
        - Effusion LDH < ⅔ ULN serum LDH

- 55 yo M s/p type A aortic dissection 2 days ago, has developed progressive dyspnea + pH 7.47 / pCO2 44 / PaO2 58 + CVP 8 + PCWP 14 + BNP 97 + bilateral crackles + CXR with pulmonary edema ("batwing appearance") → ARDS
    - Pathophys? Increased pulmonary vascular permeability
    - PCWP must be < 18 to make ARDS diagnosis!
        - Indicates that it's a non-cardiogenic pulmonary edema
    - ARDS diagnostic criteria?
        - PaO2/FiO2 < 300
        - CXR with bilateral infiltrates
        - PCWP < 18
    - Tx? Ventilation with high PEEP & low tidal volumes

DIARRHEA EXTRAVAGANZA

- Pt with recent travel to Mexico, now watery diarrhea → ETEC
- Pt with rice-water stools → Vibrio cholerae
    - Tx?
        - Rehydration with OHS (salt & sugar)
        - Macrolide or tetracycline
- Watery diarrhea in hiker/camper, pt with IgA deficiency or Bruton's agammaglobulinemia → Giardia
- Watery diarrhea on cruise ship → norovirus
- Watery diarrhea in infant → rotavirus
    - Vaccine can't be given if hx of intussusception, Meckel's, HSP
- Watery diarrhea in AIDS pt → cryptosporidium
    - Special stain? Acid-fast oocysts
    - Tx?
        - Paromomycin
        - Nitazoxanide
- Bloody diarrhea after beef consumption → EHEC, Shigella, Campylobacter
    - Campylobacter is most common cause of bloody diarrhea in US
    - Campylobacter associated with GBS
        - Dx? Albuminocytologic dissociation in CSF
        - Tx? Plasmapheresis or IVIG

- Diarrhea after abx → C. diff
    - Tx? Oral vancomycin
- Bloody diarrhea + RLQ pain + hx pork consumption → Yersinia enterocolitica
    - “Pseudoappendicitis”
- Bloody diarrhea + liver abscess → Entamoeba histolytica
    - Tx?
        - Metronidazole
        - Inject iodoquinol into abscess
- Blood diarrhea + low Hgb + low platelets + elevated Cr → HUS
    - Bugs? Shigella or EHEC
        - Shigella has very low microbe requirements for infection
- Diarrhea after oyster/seafood consumption → Vibrio parahaemolyticus
- Pt with liver dz, consumes oysters, now severely ill → Vibrio vulnificus
- Pt swam in freshwater then died soon thereafter → Naegleria fowleri
- Diarrhea & vomiting after eating fried rice → Bacillus cereus
- Vomiting 2 hrs after consuming potato salad → Staph aureus

POISONING

- 44 yo M brings 4 yo son to ED, 4 hr history of profuse sweating + drooling + watery diarrhea, BP 89/58 + HR 33 + T99.1 + RR 8, PE with diffuse wheezing + bilateral pupillary constriction, mother with myasthenia gravis → AChE inhibitor poisoning
    - Similar presentation to organophosphate poisoning
        - Organophosphates inhibit AChE
    - Tx? Atropine (anticholinergic, blocks muscarinic receptors)
    - Other overdose tx
        - Physostigmine (cholinesterase inhibitor)
            - Jimson weed (anticholinergic properties)
            - atropine overdose
        - Flumazenil
            - Benzos overdose
            - Zolpidem, zaleplon, eszopiclone
        - Naloxone
            - Opioid overdose

IRRITABLE BOWEL SYNDROME TX

- IBS will not have any PE or lab abnormalities
- IBS-D treatment
    - Loperamide (synthetic opioid)
    - TCA (anticholinergic activity)
- IBS-C
    - Stool softener
    - Lubiprostone (chloride channel activator → secretory diarrhea)

Ep. 143: Biostats Review

FYI: Here's a copy of the powerpoint slides found on the Divine Intervention website formatted to a word document. This is **NOT** the audio transcribed.

Q1
A new serum test is created to screen for peripheral arterial disease. The sensitivity of the test is 80%. The most accurate interpretation of this
statement is?

a. Patients with positive test results have an 80% chance of having the disease.
b. In patients with negative test results, 80% do not have the disease.
c. In patients who have the disease, 20% will have a negative test result.
d. Patients with negative test results have an 80% chance of not having the disease.

Q1 Key
-The best answer here is **C**.
-In my experience, **answering NBME questions rarely depends solely on doing math. Understanding** is the way to go!
-Sensitivity essentially answers the Q-**Of all the population with a given disease, what % have +ve test results?** That's it!
-The other % that you don't detect that TRULY have disease are the false negatives. The 2nd word is "negative" but the word in front of it is "false" so you know that they are in fact +ve. **I use this 2nd-1st word mantra to keep things straight**. Highly se**N**sitive tests have a low f**N**r.

Q2
A study is done on 1000 patients with a history of glioblastoma (GBM). A new serum test (ST) is done to screen for recurrent GBM. 100 patients have a positive ST test and 900 have a negative ST test. Brain imaging with biopsy is done on all these patients and 30 recurrences of GBM are found. 10 patients with positive ST tests have GBM and 20 patients with negative ST tests have GBM. Which of the following best represents the sensitivity of ST tests?

a. 92%
b. 35%

c. 75%
d. 50%

Q2 Key

-The best answer here is **B**. The sensitivity is 33%. This is the closest # to 35%. The **NBME occasionally plays this trick where inexact answers are posted**. When this occurs, pick the answer that is closest to your math.
-The Q here sounds nebulous but **simple math based on understanding** will save the day.
-Sensitivity essentially answers the Q-**Of all the population with a given disease, what % have +ve test results?**
-The **total diseased** population is **30 people**. The **# with +ve test results were 10**. So **sensitivity = 10/30 = 33%**. You're welcome to test a 2 by 2 table.

Q3

A new serum test for glioblastoma (GBM) has a specificity of 90%. The most accurate interpretation of this statement is?

a. 90% of patients with GBM have positive test results.
b. 10% of patients with GBM are missed by this test.
c. 10% of patients without GBM have positive test results.
d. 90% of patients without GBM have positive test results.

Q3 Key

-The best answer here is **C**.
-Again, simple math + understanding = The "Clutch" on this Q.
-Specificity essentially answers the Q-**Of all the population without a given disease, what % have -ve test results?** That's it!
-The specificity of this test is **90%**. So of the people w/o GBM, **90% test -ve. So 10% that should have tested -ve, ultimately end up testing +ve (aka false +ve's).**
-A highly s**P**ecific test has a low f**P**r.

Sidebar 1-SPin and SNout principle

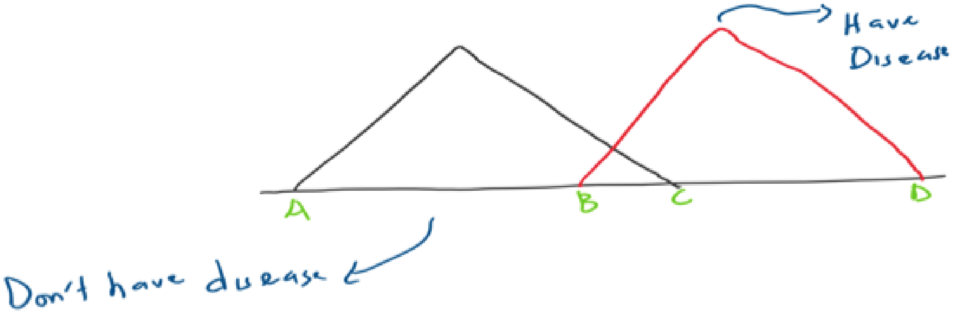
-If a test is highly sensitive, people with disease should have a +ve test result.
-If the test is -ve, then disease should be absent (aka a low FNR). A -ve test should rule OUT disease.
-If a test is highly specific, people w/o disease should have a -ve test result.
-If the test is +ve, then disease should be present (aka a low FPR). A +ve test should rule IN disease.

Sidebar 2-Screening and Confirmatory Tests

-In **tests with high sensitivity, people with disease should have +ve test results**.
-**High sensitivity tests make good "screening" tests** so you don't inadvertently miss out on people with disease. For example, you'd hate to miss out on people with HIV. This is why you use the ELISA test.
-In **tests with high specificity, people w/o disease should have -ve test results**.
-**High specificity tests make good "confirmatory" tests** so you don't inadvertently label people w/o disease as having a disease. Tests that are highly specific are very good at labeling people w/o disease so if the test is +ve (and by definition, high specificity tests have a low FPR), you very likely have disease. This is why Western

Blots are undertaken after a +ve ELISA so you don't tell a patient they have HIV based on a +ve ELISA when they don't!
-Note however, that the WB is no longer done in most places as a confirmatory test.

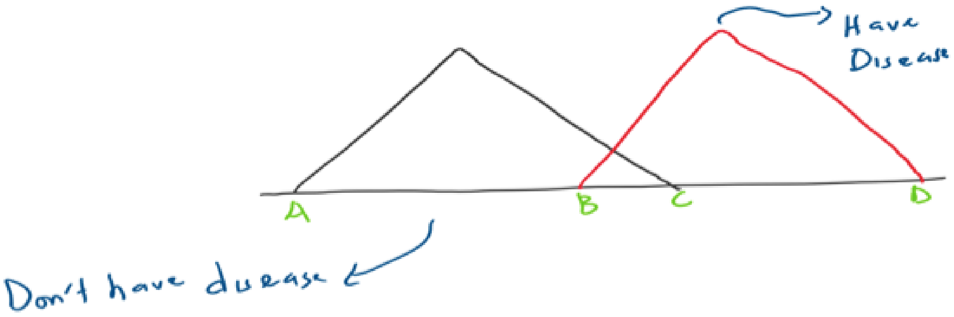
Q4
Which of the following points best represents the region of the graph with the highest positive predictive value (PPV) for the detection of Type 2 Diabetes Mellitus (T2DM)?



Q4 Key
-The best answer here is **C**.
-These Q's have a high tendency to be annoying. To beat them, remember the following;
The **highest PPV** region on a graph, corresponds to the region with the highest s**P**ecificity, which corresponds to the region that **DOES NOT miss anyone w/o disease**. If you remember this, you're golden.
-Said another way, the **highest PPV** is achieved if the test when +ve, **only includes people that have the disease**.
-**PPV** simply means the **% of people with +ve tests who have disease**.

Sidebar-Do not mix this up!
Sensitivity of a test represents the **% of people with disease who have +ve test results**.
PPV of a test represents the **% of people with +ve test results who have disease**.
DO NOT MIX THIS UP! If you switch the words before and after "who have", you should be able to keep things straight. Learn one side and remember that the other one is the other one.

Q5
Which of the following points best represents the region of the graph with the highest negative predictive value (NPV) for the detection of Type 2 Diabetes Mellitus (T2DM)?



Q5 Key

-The best answer here is **B**.

-These Q's have a high tendency to be annoying. To beat them, remember the following;

The **highest NPV** region on a graph, corresponds to the region with the highest se**N**sitivity, which corresponds to the region that **DOES NOT miss anyone with disease**. If you remember this, you're golden.

-Said another way, the **highest NPV** is achieved if the test **when -ve**, only **includes people that don't have the disease**.

-**NPV** simply means the **% of people with -ve tests who don't have disease**.

Sidebar-Do not mix this up!

Specificity of a test represents the **% of people w/o disease who have -ve test results**.

NPV of a test represents the **% of people with -ve test results who don't have disease**.

DO NOT MIX THIS UP! If you switch the words before and after "who have", you should be able to keep things straight. Learn one side and remember that the other one is the other one.

Q6

A clinical trial is conducted to measure the effectiveness of the IM test as a screening tool for the detection of testicular cancer. 500 IM tests are obtained. 20 men have positive IM tests and are found by testicular biopsy to have testicular cancer. 180 men have positive IM tests and are negative for testicular cancer by biopsy. 290 men have negative IM tests and are negative for testicular cancer by biopsy. 10 men have negative IM tests and are found to be testicular cancer positive by biopsy. What is the NPV of this test for the detection of testicular cancer?

a. 97%
b. 10%
c. 33%
d. 40%
e. 90%

Q6 Key

-The best answer here is **A**.

No need to panic on these questions with tons of numbers. Simply **define the qty** that is being tested AND then **abstract the #s you need**. Many times the #s given are not useful.

-**NPV** of a test represents the **% of people with -ve test results who don't have disease**.
-There are 300 people with -ve IM test results. Of these people, 290 DO NOT have testicular cancer. So the NPV is basically 290/300 which is 97%.

Q7
If the cutoff for a positive IM test result for the detection of testicular cancer (TC) is 5, which of the following best represents the outcome of adjusting the test cutoff value to 1?

- a. PPV would increase but NPV would decrease.
- b. Specificity would decrease but sensitivity would increase.
- c. PPV and NPV would both increase.
- d. Sensitivity and specificity would both increase.

Q7 Key
-The best answer here is **B**.
-The name of the game with biostats Q's is to first define what is being tested (doing your analysis first) before picking out an answer. When you look at the answers first, your mind is swayed in -ve directions.
-The prior cutoff is 5 (above 5, you have TC). If you bring it down to 1, you vastly increase your chances of catching every single person with TC. In other words, you don't miss anyone.
-This increases the sensitivity of a test. Whenever se**N**sitivity goes up, **N**pv goes up.
s**P**ecificity and **P**pv also go in the same direction.

Q8
A medical student at Johns Hopkins invents a drug that improves survival in patients with Glioblastoma Multiforme (GBM) by 7 years. Which of the following changes would be seen a few years after drug FDA approval?

- a. The sensitivity of screening tests for detecting GBM would decrease.
- b. The prevalence of GBM would increase in the population.
- c. The PPV of GBM detection tests would decrease.
- d. The incidence of GBM would increase in the population.
- e. The specificity of screening tests for detecting GBM would increase.
- f. The NPV of GBM detection tests would increase

Q8 Key
-The best answer here is **B**.
-By having this awesome Hopkins invented drug, **we would keep more people who have already been diagnosed with GBM alive**, which is great, so the **# of people with GBM in the population would increase**.
-Therefore, **prevalence increases**. As **P**revalence **goes up**, **P**pv should increase, hence C is wrong. **NPV would decrease**, so F is wrong (look at next slide).
-**Changes in prevalence do nothing to test sensitivity and specificity** so A and

E are wrong. T**he only things that change these qties are changes in the actual test (like modifying the cutoff values)**.

-We will likely still be diagnosing GBM at the same rate, so **incidence stays the same**.

Sidebar 1-Why does PPV increase with prevalence?

Think of this, if a person comes to the ED in December with fevers, rhinorrhea, and myalgias, they likely have the flu. If you got a -ve flu swab result, would you believe this?

The prevalence of the flu goes up in December so NPV goes down, but PPV goes up. You are **less likely to believe the results of a -ve test during this "high prevalence" period**.

Stated another way, you are a lot more likely to believe the results of a +ve test if the disease is common!

Sidebar 2-Incidence vs Prevalence

-**Incidence** represents the # of new cases of a disease that have been diagnosed within a specific time period.

-**Prevalence** is the # of people that are alive AT a given time period.

Q9

An M2 (2nd year med student) researcher at The Gifted Medical Students Institute plans to study the effects of consuming high amounts of kale on the development of pheochromocytoma. He plans to publish the results of his study prior to graduation. Which of the following study designs presents the most appropriate means of completing the study?

a. Randomized control trial.
b. Prospective cohort study.
c. Crossover study.
d. Case-control study.
e. Case report.

Q9 Key

-The best answer here is D.

-The phenomenon the researcher is trying to measure here is **exceedingly rare and he has a limited time frame**.

-Approaching this by way of a prospective cohort study/RCT would literally take as much time as a 60+ year medical career.

-To study **rare phenomena, case-control studies** are typically the best option on NBME exams.

-Results generated from the CCS can then be used to formulate research Q's that can be examined in a cohort study/RCT.

Sidebar-Case-Control Studies

-In a CCS, you need **2 groups** of people with **similar characteristics**.

-**Group 1 have** the disease in Q (pheo), **Group 2 do not** have the disease in Q (no pheo).

-You then **ask about exposures** they may have had back in the day. You should already imagine that **recall bias** may be a prominent issue with CCS.

-It is HY to know that CCSs give rise to data pertaining to **odds ratios**.

Q10

A professor and 2 medical students undertake a case control study over the course of a year and publish their results in a high impact journal. Which of the following best represents an example of a possible conclusion from their study?

a. Duloxetine decreases pain scores in patients with fibromyalgia.
b. A combination of Sofosbuvir and Ledipasvir cures hepatitis C with high fidelity.
c. Asbestos exposure causes mesothelioma.
d. Ursodiol administration improves survival in patients with primary biliary cholangitis.

Q10 Key

-The best answer here is C.
-In option C, the researchers essentially looked at people with mesothelioma and compared them to people w/o mesothelioma. They likely determined that a good # of people with mesothelioma had **prior exposure to asbestos**.
-Option A, B, and D are wrong because they **involve "interventions"** which are things you'd ordinarily do in a RCT.
-As is evident with this Q, you can't just memorize facts and do well on these USMLE exams. You actually need to **understand concepts**. This is the **central principle behind doing well regardless of Q difficulty on these exams**.
-CCS/Cohort studies deal with exposures, RCTs deal with interventions. **DETOUR**

Q11

The average normal CD4 count is 1000 per mm3 of blood with a standard deviation of 100/mm3. Which of the following best represents the normal percentage of individuals who would be measured to have a CD4 count > 1200/mm3 of blood?

a. 2.51%
b. 95%
c. 5%
d. 16%
e. 68.2%

Q11 Key

-The best answer here is A.
-The key principle to realize here is that **95% of the population will fall within 2 SDs** (2*100 = 200) of the mean-from 800-1200.
-So **5% must fall "outside" this range on "either side". Either side here** means < 800 or > 1200.
-Therefore, half of this 5% must have a CD4 count that is < 800/mm3 and the other half must have a CD4 count that is > 1200/mm3.

-So the **best answer is 2.51%**. Make sure you know this for the USMLEs!

Sidebar-P Values (Statistical Significance)

-P values are used to express the probability that the results of a study occur from chance events.

-The lower the number, the more confident we are in the results of that test. In other words, a P value of 0.05 (5% probability of obtaining results by chance or 1 in 20) is worse than a P value of 0.01 (1% probability of obtaining results by chance or 1 in 100).

-Unless you're told otherwise, use a P value of 0.05 in every NBME question.

Q12

4 separate drug trials are conducted to test the relative effectiveness of 4 different 3-beta hydroxysteroid dehydrogenase agonists in raising libido. The mean "libido" levels in the study (with confidence intervals) are graphed below. Which of the following statements are true?

Q12 contd. (multiple answers may be correct)

a. Drug 1 is more effective than Drug 2.
b. Drugs 3 and 4 are similar in effectiveness.
c. Drug 4 is more effective than Drug 2.
d. Drugs 1 and 4 show similar effectiveness.

Q12 Key

-Statements A, B, and D are all true.

-The general principle is that **when 2 confidence intervals cross each other (lines overlap), there is no difference b/w those treatments**.

-These scenarios are unfortunately very common on the USMLEs.

-Another critical way this can be tested is to give you **confidence intervals (CI) of epidemiological quantities that are ratios or differences**;

A **ratio** driven qty (like relative risk) will have **non-significant results if the CI crosses 1**. A **difference** driven qty (like absolute risk reduction) will have **non-significant results if the CI crosses 0**. Why???

Q13

A study is done to assess the relationship between vaping in college and the future need for lung transplant. The study yielded a relative risk of 3.5 with a p value < 0.05. Which of the following represents a possible 95% confidence interval from this study?

a. 0.5-3.5
b. 2-4.5
c. 3.5-6.0
d. 3.9-7.1
e. 0.71-3.68

Q13 Key

-The best answer here is B.

-A and E are wrong b/c the CI includes 1 but this study is **measuring a relative risk (which is a ratio), so you cannot have significant results and have the CI cross 1**.

-A and C are wrong b/c the RR derived from the study either begins or ends the CI. This is not possible. **Results obtained from a study have to be WITHIN the CI, they cannot BEGIN or END the CI**.

-D is wrong b/c it **does not include the value obtained from the study**.

-Pls be absolutely sure you understand this.

Q14

A study is done to assess the effectiveness of a new drug (D) for the treatment of GBM. All patients enrolled in the study received the current standard of care (SOC). In addition to receiving SOC, Group A received drug D; Group B received SOC and a sham drug (Y). Of the 40 patients receiving D, 8 die over the course of the study. Of the 40 patients receiving Y, 20 die over the course of the study. What is the NNT for drug D?

a. 2.7
b. 3.3
c. 13.3
d. 5.0
e. 15.5

Q14 Key

-The best answer here is B.

-To calculate the **NNT, you need to find the difference in risk b/w patients exposed to D and the patients exposed to Y (placebo). You then divide the answer obtained into 1**. That's it!

-Stated another way, **NNT is 1/Absolute Risk Reduction**.

-40 people got D, 8 died (20%). 40 people got Y, 20 died (50%). The difference here is 30% (or 0.3).

-Dividing this into 1 gives (1/0.3) which yields 3.3.

-The **NNH** is a qty that has a similar calculation but follows the mantra that **the rate of harm in the "exposed/treatment" group exceeds that in the placebo group**.

-To make things **even easier** (and only remember 1 formula), take **1/the difference in risk b/w any 2 groups given. Just always write the higher risk # first in the difference**.

Sidebar-Relative Risk

-To calculate **relative risk, take the risk in the exposed population and divide it by the risk in the unexposed population**.

-For example, if a cohort study comparing smokers and non-smokers is done with 100 of 500 people in the smoking group developing lung cancer and only 50 of 500 people in the non-smoking group developing lung cancer. The RR is 20%/10% (risk of LC in smokers/risk of LC in non-smokers) which is 2.

-The smokers have a 2-fold increased risk of LC compared to non-smokers.

Q15
If the presence of dysmorphic erythrocytes in the urine has a sensitivity of 90% and a specificity of 45% for the detection of IgA nephropathy, what is the likelihood ratio of having IgA nephropathy if the patient has dysmorphic erythrocytes detected on urinalysis?

a. 1.35
b. 0.45
c. 4.55
d. 2.33
e. 1.67

Q15 Key
-The best answer here is E.
-**Likelihood ratios** occasionally pop up on the USMLEs. The classic worry of many students is to decipher **when to use the +ve LR formula (Sensitivity/1-specificity) vs the -ve LR formula (1-sensitivity/specificity)**.

Here's the rule;
If the patient has a **+ve test result, use the +ve LR formula**.
If the patient has a **-ve test result, use the -ve LR formula**.
In this Q, we need to use the +ve LR (0.9/1-0.45) = 1.67

Sidebar-Likelihood Ratios
-When calculated, +ve LRs tell you how much more likely a phenomenon is given a +ve test result.
-When calculated, -ve LRs tell you how much less likely a phenomenon is given a -ve test result.

Q16
In a study examining the relationship b/w exposure to ketamine and the subsequent development of neutropenia, medical records of 300 children were reviewed. 100 children who were exposed to ketamine were found to have neutropenia, 50 children who were exposed to ketamine were found to not have neutropenia, 80 children who were not exposed to ketamine were found to not have neutropenia, and 70 children who were not exposed to ketamine were found to have neutropenia. What is the odds ratio for this study?

a. 3.29
b. 2.29
c. 5.67
d. 2.23
e. 7.16

Q16 Key
-The best answer here is B.
-Odds ratios compare the odds of a person with disease being exposed to a risk factor (RF) to the odds of controls being exposed to the same RF.
-To calculate OR, take the logical people product (LGP)/weird people product (WPP).
-LGP = (exposed and affected, unexposed and unaffected)/WPP(exposed and unaffected, unexposed and affected).
-In this case our OR = 100 * 80/70*50 = 8000/3500 = 2.29.

Q17
The mean blood glucose level of a group of 81 medical students was 170 mg/dL with a SD of 15 mg/dL. Calculate the 95% CI and in words interpret your results.

Q17 Key
Mean = 170 mg/dL. Std error of the mean = 15/sq.rt of 81 = 1.67 mg/dL.
Z-score for the 95% CI = 2 (1.96 is more accurate but doesn't matter).
Therefore, CI = 170 +/- (2*1.67) = 170 +/- 3.34 = 166.66-173.34
You can say with 95% confidence that the real mean BP of the medical student population falls between 166.66 and 173.34 mg/dL.
Alternatively, you can say that the mean BP of any randomly selected group of 81 medical students will fall b/w 166.66 and 173.34 mg/dL 95% of the time if the same experiment is repeated on multiple occasions.
HY to know the calculation and the interpretation in words!

Other HY Concepts
-For **ROC curves**, the best test (highest combined sensitivity and specificity) lies at the upper left corner of the graph.
-**Cohort studies** essentially involve looking at 2 groups of people with differential exposures and following them into the future for the development of some outcome.
They could be prospective or retrospective.
-68%, 95%, and 99.7% of a normal population lie b/w **1, 2, and 3 SDs** of the mean respectively.

Other HY Concepts contd.
-To compare **means of 2 groups, use the T test. For > 2 groups, use the ANOVA (or F) test**.
-When you **incorrectly reject the null, you are committing a Type 1 error (alpha error). When you incorrectly accept the null, you're committing a Type 2 error (beta error)**. Remember that **power = 1-beta.**

-Tighter CIs tell you that a study is more precise. However, you should be a lot less confident in the results of the study as the CIs are too narrow (less room for error).

Other HY Concepts contd-Increasing power

To **increase the power** of a study;

-**Recruit more people** for a study (more closely approximates the population).

-Have a large difference b/w 2 qties you're trying to measure (aka larger effect size). The power of a study comparing people with test scores of 99 and 100 as a means of comparing intelligence has less power than one comparing test scores of 25 and 100.

-Have a lot of your data for a measured qty cluster around 1 value. Increasing the precision of your measurements also increases the power of a study.

-Stated another way, a study that **uses a P value of 0.01 has more power than one using a P value of 0.05**.

Other HY Concepts contd.

-The fact that something is statistically significant does not mean that it is clinically significant. A BP drug that lowers BP by 1 mm Hg from baseline even at a p value < 0.01 is a useless drug.

-**Mean** is the average. **Median** represents the middle # (if you have an odd # set of data) OR the mean of the 2 middle #s (if you have an odd # set of data). **Mode** represents the most frequent qty in the data set. Arrange these in order before making these determinations. **The mean is affected by extreme values**.

Other HY Concepts contd.

-For a **normal** distribution, **mean = median = mode**

Remember that **mean precedes median which precedes mode when taken in alphabetical order**.

-This should help you remember that in a **-vely skewed curve** (flat portion at left), **mean < median < mode**.

-In a **+vely skewed curve** (flat portion at right), **mean > median > mode**.

-HY **bimodal distributions** to be aware of include the distro for Hodgkin's lymphoma and slow/fast acetylators in the metabolism of some drugs.

Other HY Concepts contd.

-Lead time bias involves erroneously thinking that survival has been improved when in fact the "apparent survival improval" arose primarily from detecting a disease early.

Cross checked: No

Ep. 145: Rapid Review, Series 14, Surgery

- Kid w/mild RLQ pain guaiac positive stool → **Meckel's**
    - Failure of obliteration of the vitelline duct/omphalomesenteric duct
    - Tech-99/Pertechnetate scan for diagnosis
    - Gastric mucosa secretes acid that erodes the GI tract and causes bleeding
        - Not in most cases, just symptomatic cases
    - Treated with resection

- Pt w/ hx of Crohn's has n/v and no bowel mvmts → **small bowel obstruction**
    - Obstructed d/t strictures (GERD can also cause strictures)
- Pt w/ hx of UC has severe abdominal pain, distended, transverse colon → **toxic megacolon**
    - Next best step = ex lap
    - Other things that can cause toxic megacolon: c.diff, chagas
    - Screening colonoscopies 8 yrs after diagnosis and every 1-2 yrs after
    - PSC and UC diagnosed at the same time → screening colonoscopy at time of diagnosis
- Pt w/ 3 mos of fatigue, low mood, bradycardic, carpal tunnel → **hashimoto's thyroiditis**
    - Most common cause of hypothyroid in US: hashimoto's w/ anti TPO abs
    - Most common cause in newborn: thyroid dysgenesis
    - Radioactive iodine uptake: minimal to none
    - Other causes of hypothyroid:
        - **de Quervain's thyroiditis** (painful, tender thyroid, hx of recent viral URI, decreased radioactive uptake) (can also cause hyperthyroid in early thyrotoxic phase)
        - **Factitious hyperthyroid** → low TSH, low radioactive uptake, *low thyroglobulin*
    - **Grave's** → autoab's against TSH receptor, diffusely increased uptake on radioactive scan
    - **Struma ovarii** → elevated T3/T4, low TSH, decreased uptake on radioactive scan
    - **Toxic adenoma** → only 1 hotspot on radioactive scan
    - **Multinodular goiter** → multiple hotspots interspersed w/cold spots
    - **Papillary thyroid cancer** is popular aka most common
        - Psammoma bodies and orphan Annie eye nuclei
    - **Follicular thyroid cancer** spread hematogenously
- 80 yo pt w/profound wt loss and enlarging thyroid → **anaplastic thyroid cancer**
- Pt had multiple kidney stones, recurrent ab pain, enlarging thyroid → **medullary thyroid cancer**
    - MEN2A- hypercalcemia
    - Calcitonin tumor marker → can cause prolonged QT
    - Apple green birefringence on congo red b/c it becomes amyloid
- Rock hard thyroid gland → **Reidel's thyroiditis** (Fibrosis of the thyroid)
    - Associated w/ IgG4 related dz → Autoimmune pancreatitis (sausage shape), retroperitoneal fibrosis (BL hydronephrosis), autoimmune gallbladder dz
- Psammoma bodies: papillary thyroid cancer, meningiomas (parasagittal, dural tail), mesothelioma (ferruginous bodies)
- Pt w/ n/v, coffee bean sign w/head toward RUQ → **sigmoid volvulus**
    - Coffee bean sign w/head toward LUQ → **cecal volvulus**
- Pt w/ heavy smoker, wt loss, dullness to percussion, decreased breath sounds, larger pleural effusion, coin lesion
    - Next best step = thoracentesis w/cytology (Malignant cells → stage 4 cancer)
- #1 cause of lung cancer → **adenocarcinoma**
- **Squamous cell carcinoma** → keratin pearls, hypercalcemia (PTHrP)
- **Small cell lung cancer** → SIADH (hypoosmolar serum, hyperosmolar urine), Lambert Eaton (Ab against presynaptic Ca channels → proximal muscle weakness improves w/use), and Cushing's (ACTH does not suppress w/dexamethasone)
    - Neuroendocrine origin, already metastatic at diagnosis
- Lung cancer complications: SVC Syndrome (next best step is radiation), pancoast tumor (Horner's syndrome), hypertrophic pulmonary osteopathy (get imaging)
- Partial Horner's syndrome (ptosis and miosis) → **cluster headache**
- Xanthochromia → **subarachnoid hemorrhage**
    - Worth HA of pt life, often mimics meningitis but is sudden onset
    - Next best step = non contrast head CT → LP
    - Give nimodipine to prevent superimposed ischemic stroke
- **Herpes encephalitis/meningitis** → hyperintense signalling in temporal regions on MRI

    - RBCs in CSF → cover w/IV acyclovir (only give IV if admitting pt)
- 6 wk period of memory, myoclonus, and proprioception loss → **CJD**
    - Elevated protein 14.3 3
- **Narcolepsy** → low levels of orexin/hypocretin in CSF
    - Diagnose w/ sleep study, treat w/scheduled naps, stimulants (modafinil), sodium oxybete (for cataplexy)

These are my personal notes from when I originally listened to the podcast. I apologize for anything I overlooked or any mistakes!

Cross Checked: No

Ep. 159: Rapid Review Series 18 (IM)

- 65 yo M with 2 weeks of hematuria + recent 20 lb weight loss. Worked as a plumber. PMH of EGPA. Non-smoker. UA with hematuria, no dysmorphic RBCs. → Bladder cancer
    - RF in this case? Meds (likely cyclophosphamide for EGPA)
    - Cyclophosphamide
        - Adverse effects? Hemorrhagic cystitis, bladder cancer
        - Prevention? Mesna
    - Dx? Cystoscopy w/ bx
    - RF for bladder cancer
        - Smoking
        - Schistosoma haematobium
        - Aniline dyes
- Flank mass + hematuria + new-onset varicocele in longtime smoker → RCC
    - Most common type? Clear cell
    - Dx? Do NOT biopsy
    - Tx? Nephrectomy
    - Paraneoplastic syndrome? Polycythemia 2/2 epo production

- 23 yo F, roommates note behavior change, working on multiple projects to cure poverty, sleeps less than 2 hrs but lots of energy, med student can't get word in during interview, urine tox is negative → bipolar disorder
    - Tx?
        - Lithium
            - Ebstein's anomaly
        - Valproic acid
            - Liver toxicity
            - Teratogen

- ACE-I contraindications
    - Bilateral renal artery stenosis
        - Already low GFR

        - Pathophys? ATII constricts efferent arteriole. ACE-I → low ATII → efferent arteriole constricts → possible renal failure
    - Hereditary angioedema
        - Pathophys? C1 esterase inhibitor deficiency. C1 esterase and ACE both breakdown bradykinin. Block ACE → can't break down bradykinin
    - Pregnancy

- 50 yo F with large breast mass, nipple retraction, skin changes. Hx of depression on paroxetine, currently well-controlled. Says that she is not interested in knowing diagnosis. NBS? Ask pt why she doesn't want to know diagnosis
    - Always explore the patient's mental model!
- 45 yo F Crohn's on etanercept. Comes to ED with dyspnea + nonproductive cough + fever + 12 days malaise. Na 131. PaO2 = 57. CXR with "diffuse ground glass interstitial infiltrates." PPD 3 years ago was negative. No sick contacts. → PCP pneumonia
    - Many brain or lung pathologies can cause SIADH
    - Labs? Elevated serum LDH
    - Dx? BAL w/ silver-stain positive organisms
    - RF?
        - HIV
        - TNF inhibitors
    - Before you start a TNF inhibitor, screen for what?
        - TB
        - Hep B
    - Contrast with Strep pneumo → more rapid onset, severe sxs, lobar consolidation
    - Contrast Legionella → pneumonia + diarrhea/abdominal pain + hyponatremia + exposure to water source (e.g. hotel, fountain, air conditioning) → Legionella
    - Contrast with TB → fever + night sweats + hemoptysis + cavitary lesion (not interstitial infiltrates)

- 33 yo F with fatigue + loss of interest + 10 lb weight gain + bilateral LE edema + missed last 2 periods → Hashimoto's thyroiditis
    - Dx? TSH
    - Ab? anti-TPO
    - Histology? Lymphocytic infiltrate of thyroid gland
    - Associations? Other immune diseases
        - Vitiligo
        - Pernicious anemia
    - Complications
        - Initial thyrotoxic phase
            - Pathophys: release of preformed thyroid hormone
        - Hx Hashimoto's + rapidly enlarging thyroid → thyroid lymphoma
    - Why the missed periods?
        - Low T3/T4 → TRH release → TSH & prolactin release → suppresses HPG axis
- Low TSH + low T3/T4 → secondary hypothyroidism
    - Causes?
        - Craniopharyngioma

            - Derived from? Rathke's pouch
        - Sheehan's syndrome
- Painful thyroid + hx viral URI → De Quervain's subacute thyroiditis
    - Hypothyroid or hyperthyroid (2/2 release of preformed hormone)
    - RAIU? Low uptake (not producing thyroid hormone)
- ICU pt + mildly low T3/T4 + mildly low TSH → euthyroid sick syndrome
- High estrogen → increases TBG → higher total T4 but free T3 normal → clinically euthyroid
- Thyroid cancer
    - Labs? Elevated TSH (thyroid cancers tend by hypofunctional)
    - Dx? US with biopsy
    - #1 RF? Radiation to head & neck
    - Papillary
        - Most common type
        - Spread? lymphatic
        - Histology? Psammoma bodies + Orphan Annie eyes
    - Follicular
        - Spread? Hematogenous
    - Medullary
        - Tumor marker? Calcitonin
            - Calcitonin → hypocalcemia → prolonged QT
        - Association? MEN2A/2B
            - Mutation? RET gene
            - Inheritance? AD
            - Prevention? Prophylactic thyroidectomy (risk = 100%)
        - Histology? Apple green birefringence on congo red stain

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Ep. 161: The "Clutch" Antibody Podcast

ep 161 notes were graciously provided by Divine Intervention from an anonymous contributor.

Sx	Dx	Specific	
Morning stiffness, better w exercise, ulnar deviation	*Rheumatoid arthritis*	Anti-**RF** (sensitive), Anti-**CCP** (specific)	
Malar rash	*Lupus*	**ANA** (sensitive), Anti-**smith**, anti-**dsDNA** (specific)	Ab can cause 3rd degree heart block by crossing placenta
Autoimmune hemolytic anemia	*Lupus*		

Pregnant woman w size less than dates, recurrent pregnancy losses	*Antiphospholipid antibody syndrome*	Anti-**phospholipid**, anti-**cardiolipin**, **lupus** anticoag, anti-**beta2-glycoprotein**	
Marital problems d/t pain w sexual intercourse, dry mouth	*Sjogren's*	Anti-**ro** (SSA), anti-**la** (SSB)	Ab can cause 3rd degree heart block by crossing placenta!
	Wegner's	**c-ANCA**	
	Ulcerative colitis, PSC, polyarteritis nodosa, Churg-Strauss/EGPA, microscopic polyangiitis	**p-ANCA**	
Prox muscle, shoulder weakness; elevated CK	*Polymyositis, dermatomyositis*	Anti-**Jo1** (--| tRNA synthetase), anti-mi 2, anti-**SRP**	
Bleeding gums, plt >20,000	*ITP*	Anti-**Gp2b3a**	Vs. Glanzmann (complete deficiency of Gp2b3a)
45F, jaundice, pruritus, conjugated hyperbili	*Primary biliary cholangitis*	Anti-**mitochondrial**	
	Systemic scleroderma	Anti-Scl 70**/topoisomerase**	
	CREST	Anti-**centromere**	calcinosis + Raynaud + esophageal + sclerodactyly + telangiectasia
TB tx with new malar rash	*Drug-induced lupus*	Anti-**histone**	Sulfonamides, etanercept, procainamide, hydralazine, isoniazid
	Mixed-connective tissue disease	Anti-**U1RNP**	

	Post-infectious glomerulonephritis	Antistreptolysin **O**, anti-**DNAse B**	
17Y w/ diabetes	*T1DM*	Anti-islet cell antibodies = **GAD, IA2**	
Hypothyroidism	*Hashimoto's*	Anti-**thyroglobulin**, anti-**TPO**	*MCC of hypothyroidism in US
Hyperthyroid	*Graves*	**Thyroid-stimulating** immunoglobulin	
40F, Droopy eyes	*Myasthenia gravis*	Anti-**nicotinic ach** receptor	
	Hemolytic disease of newborn	Anti-**Rh**, anti-**Kell**	
Encephalitis, post URI/vaccine/VZV	*Autoimmune encephalitis*	Anti-**NMDA**	
H/o breast cancer, ataxia	*Limbic encephalitis*	Anti-**Hu**, anti-**Yo**	
	Autoimmune hepatitis	Type 1: anti-**smooth muscle**; Type 2: anti-**liver/kidney/microsomal**	"lupoid-hepatitis"
Painful vision loss that resolves after few weeks, lose all sensation below T4/T10	*Neuromyelitis optica/Devic's disease*	Anti-**NMO**	MS-variant
Hematuria, hemoptysis	*Goodpasture syndrome*	Anti-**GBM**	
	Pemphigus vulgaris	Anti-**desmoglein** (desmosomes)	
	Bullous pemphigoid	Anti-**hemi****-desmosomes**	Less dangerous than pemphigus, nikolsky-negative
Fat malabsorption, low weight, rash on extensor surfaces of upper/lower extremities w/o silver scale	*Celiac disease*	Anti-**gliadin**, anti-**TTG**, anti-**endomysial**	

Smoked for long time, trouble rising from a char	*Lambert-Eaton syndrome*	Anti-**presynaptic voltage gated Ca channel**	
Loss of LE vibratory sensation, Babinski+, (UMN + LMN sx)	*B12 deficiency* 2/2 *pernicious anemia*	Anti-**IF** (parietal cells)	

Sx	Dx	HLA	
	Seronegative spondyloarthropathy	**HLA-B27**	
Recent HIV tx, profound anaphylaxis + death!	**Abacavir**-anaphylaxis	**HLA-B57**	
Iran, painful sores on buccal mucosa	***Behcet's disease***	**HLA-B51**	Dx: pathergy test

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Ep. 163: Rapid Review, Series 19, Surgery (Abdomen)

- NBSIM for penetrating trauma to the abdomen ⟶ ex lap
- NBSIM for blunt trauma to abdomen + rebound and guarding (signs of peritonitis) ⟶ ex lap
- NBSIM for blunt trauma to abdomen + stable + no rebound or guarding ⟶ CT abdomen
- NBSIM for blunt trauma to abdomen + unstable ⟶ FAST scan (then DPL if FAST is equivocal/negative)
- Cardiac cath and hours later patient has back pain, hypotensive, unstable ⟶ Dx is retroperitoneal hematoma/hemorrhage ⟶ get emboli angiogram for NBSIM
- Pt involved in MVC + has minimal urine output. PEx shows suprapubic tenderness or fullness.

  - Dx? Urinary retention or cauda equina syndrome.
  - NBSIM? urinary cath
  - Mets cancer with hx of prostate cancer? suprapubic fullness, breast cancer, prostate cancer, spinal cord compression → give IV dexamethasone
  - Tx for female with breast cancer + subrapubic tenderness? IV dexamethasone

- Bladder rupture
  - NBSIM for intraperitoneal rupture (dome) with diffuse pain + signs of peritonitis → straight to urology surgery
  - NBSIM Extraperitonal rupture of neck of bladder/trigone → conservative treatment

- Pt involved in MCV + **left** shoulder pain → Spleen rupture (+Kehr sign)
  - Vaccinate these patients for SHiN organisms

- Pt involved in MVC gets blunt abdominal trauma + **right** shoulder pain → liver laceration with diaphragmatic rupture on left side typically (abdominal contents in thoracic cavity)

- Recent abdominal surgery + fever + abdominal pain for days → Subphrenic abscess

- Newborn with abdominal folds/contents in thoracic cavity → Diaphragmatic hernia
  - Embryo: diaphragmatic hernia arises from pleural peritoneum membrane

- Injury or MVC or **child with epigastric pain due to handlebar injury** + ↑amylase/lipase → traumatic pancreatitis

- Kid with **handlebar injury** + epigastric pain or back pain + **pulsatile mass** + bilious vomit + low Hb → Duodenal hematoma

- Pt started on warfarin + has epigastric pain + low Hb → Duodenal hematoma

- Peptic ulcer disease + sudden hypotension + low Hb + severe abdominal pain ⟶ Perforation of peptic ulcer due to gastroduodenal artery laceration (this can bleed like crazy!)
    - NBSIM? EGD

- Massive GI Bleeds management
    - 2 large IV bore needles
    - IV fluids, blood products
    - Consider surgery

- Acute-onset RLQ pain + fever + leukocytosis + +Psoas sign ⟶ acute appendicitis
    - NBSIM? Ex lap (or laparoscopic appendectomy)
    - Pathophys? Fecolith that obstructs appendiceal lumen.
    - NBSIM for perforated appendicitis ⟶ rapid appendectomy!
    - NBSIM for appendiceal abscess ⟶ abx, drain + appendectomy ***weeks later***

- Pt with 7-9 days of gradually worsening RLQ pain + fever + leukocytosis ⟶ Psoas abscess
    - Dx? CT contrast
    - Tx? ciprofloxacin + metronidazole or cefazolin
    - **Note**: Psoas abscess has similar presentation to appendicitis but psoas abscess presents with DAYS of symptoms
        - In contrast: appendicitis presents ACUTELY!

- PEx findings for appendicitis
    - Psoas sign
    - Obturator sign
    - Rovsing sign
    - Mcburney point

- Young adult female with RLQ pain + high fever + leukocytosis + b-HCG positive ⟶ Ruptured ectopic pregnancy

- Pt with hx of recent MI, irregularly irregular interval.
    - Dx? Acute mesenteric ischemia - superior mesenteric artery is messed up
    - Get angio
    - May need to resect bowel

- LUQ pain with eating + weight loss + systemic hypotension = Chronic mesenteric ischemia

- Hx of ulcerative colitis + severe abdominal pain with rebound and guarding + abd distention + massive dilation of colon → Toxic megacolon.
    - NBSIM? IV steroids (hydrocortisone, dexamethasone) followed by surgery (if no response to medical management)
    - Other etiologies of toxic megacolon?
        - *C diff* colitis (2/2 abx use)
        - *Trypanosoma cruzi* (pt from South America)

- Female has severe lower abdominal pain + bilateral adnexal tenderness → Pelvic inflammatory disease
    - Tx? ceftriaxone + doxycycline/azithromycin

- Female with hx of PID + now pt ℅ RUQ pain → Peri-hepatitis aka Fitz-Hugh-Curtis syndrome
    - Pathophys? Inflammation of the hepatic capsule

- NBSIM for Appendicitis? Go straight to surgery
    - But if NBME wants you to pick imaging: CT for adults; or U/S for children or pregnant females

- NBSIM for stable pt with hx of diabetic who has abdominal pain and needs CT with contrast?
    - Discontinue metformin
        - Because metformin causes lactic acidosis in pt's with CKD or AKI, esp. if pt has profound hypotension with pre-renal AKI

- Smoker + severe mid-abdominal pain or back pain + profound hypotension + pulsatile mass on abdominal exam → Ruptured AAA

  - Calcifications anterior to vertebral body = ruptured or impending AAA
  - NBSIM? immediate surgery (can get abdominal US if NBME asks for imaging)

- AAA Surgery Options: Open Surgical Repair or EVAR

- Complications of AAA Repair:
  - **Aorto-enteric fistula**
    - Presentation? **Microcytic anemia** *weeks to months* after AAA repair
    - Pathophys? fistula between aorta and GI tract -> slow leak of blood into GI tract.
    - Note: Colon cancer will be an incorrect answer choice.

  - **Anterior Spinal Artery Syndrome**
    - Presentation? **Multiple episodes of profound hypotension during surgery** + paraplegic + cauda equina style symptoms or urinary retention after surgery
    - Pathophys? Ischemia to Artery of Adamkiewicz → damage to anterior 2/3 of spinal cord
  - **Acute Tubular Necrosis or Prerenal AKI**: Rising SCr after AAA repair
    - Pathophys? Ischemia of kidneys during surgery

  - **Endoleak**
    - Presentation? Pt had AAA repair + Hb is slowly dropping + microcytic anemia + contrast going beyond margins of excluded aneurysm on CT angiogram

- #1 RF for AAA? smoking

- Screen for AAA in:
  - male smokers b/w age 65-75yo
  - male smokers or nonsmokers > 50 yo with first-degree relative who had AAA rupture

- NBSIM based on imaging findings of AAA Screening:
  - AAA > 5.5cm or AAA >0.5 cm/6 months → repair asap
  - Prior u/s shows 3-4 cm AAA → repeat U/S in 2 years

  - Prior u/s shows 4-5 cm AAA → repeat U/S in 1 year
  - Prior u/s shows 5-5.5 cm AAA → repeat U/S in 6 months

- Young female + sudden-onset abdominal pain + cyst found weeks earlier on imaging → ovarian torsion
  - Tx? urgent surgery
  - Risk factors:
    - PCOS
    - Fermoid cyst
    - Teratoma
    - Prior ovarian cyst
  - **Note**: If **"free fluid in peritoneum"** mentioned in vignette → pick **ruptured ovarian cyst**
  - **Note**: If "free fluid in peritoneum" is not mentioned in vignette → pick ovarian torsion

- Pt has bulging abdominal mass for a long time + mass is not reducible + severe abd pain → strangulated hernia
  - Tx? surgery

- Pt has RUQ pain + shoulder pain + fever + leukocytosis → acute cholecystitis.
  - Dx? RUQ U/S (then HIDA scan ***if*** U/S is equivocal)
  - Imaging findings? Thickened gallbladder wall + pericholecystic fluid
  - Tx? laparoscopic cholecystectomy + abx
  - NBSIM if RUQ US is equivocal? get HIDA scan
    - Negative HIDA scan = GB fills with contrast → this r/o acute cholecystitis!

- Elderly or critically ill pt + RUQ pain + fever + leukocytosis + no gallstones on imaging → acalculous cholecystitis.
  - NBSIM? Percutaneous cholecy**stostomy (NOT cholecystectomy)**
  - These patients are very sick, e.g. on ventilators, ICU level care, etc

- RUQ pain + fever + leukocytosis + profound jaundice with signs of ascending cholangitis. Common bile duct is **not** distended on imaging → **Mirizzi syndrome**

  - Pathophys? obstructing stone in cystic duct → cystic duct dilation bulges to press on common hepatic duct → direct hyperbilirubinemia
  - Cholecystocholedochal fistula = complication of Mirizzi syndrome
    - fistula between cystic duct and common hepatic duct
  - Dx? RUQ U/S or MRCP

- RUQ pain + fever + leukocytosis + jaundice + hypotension → ascending cholangitis.
  - NBSIM? ERCP (diagnostic and therapeutic)
  - Ascending cholangitis is an emergency!

- RUQ pain + **no** fever + dilation of common bile duct → choledocliathsis
  - Dx? RUQ U/S (or MRCP if equivocal)
  - Pt's with choledocholithasis are not as sick patients as pts with ascending cholangitis!

- NBSIM for blunt trauma to abdomen involving kidney → Non-operative management
  - Do not do nephrectomy!

- Kidney transplant - new kidney in the pelvic fossa and bad kidney is not removed

- Pt has hx of peritoneal dialysis + mild fever (100.7) + acting crazy (AMS) + low-grade abdominal pain.
  - Dx? Spontaneous bacterial peritonitis
  - NBSIM? Paracentesis (>250 PMNs)
  - Tx? Ceftriaxone or cefotaxime.
  - PPx for pts with ascites but no fever? Fluoroquinolone

- Peritoneal dialysis vs hemodialysis - no difference in outcome
  - Peritoneal dialysis = Insert cath at least 1 month prior
  - Hemodialysis = Insert AV fistula at least 2 months prior

- Pt with recent AV fistula placed for hemodialysis + chest pain + hypotension + crackles in lungs with heart failure symptoms + Echo shows EF 75% → High output heart failure
  - Etiologies of high-output heart failure?
    - AV Fistula

        - Anemia
        - Paget disease of bone (d/t hypervascularization of bone marrow)

- Tx for acute pancreatitis? NPO + IVF + pain control
    - #1 MCC acute pancreatitis? Alcoholic pancreatitis
    - #2 MCC acute pancreatitis? Gallstone pancreatitis
        - Gallstone pancreatitis = RUQ pain + ↑amylase/lipase **+ gallstones + ALT ≥ 150**

- Pt has abdominal pain + epigastric tenderness and fullness + hx of pancreatitis *weeks* ago → Pancreatic pseudocyst

- Chronic epigastric pain + fat malabsorption + white dots in the walls of pancreas on imaging → Chronic pancreatitis
    - #1 RF = EtOH abuse

- Elderly pt with LLQ pain + fever + leukocytosis → Diverticulitis
    - NSBIM? CT with contrast
    - Tx? abx
    - What imaging is needed weeks later? Colonoscopy (to r/o colon cancer as source of bleed)

- Pt has hx of diverticulitis + now has poop or air in urine --> Colovesical fistula

- Severe abdominal pain + coffee-bean sign with head of coffee-bean sign is oriented to RUQ → sigmoid volvulus

- Severe abdominal pain + coffee-bean sign with head of coffee-bean sign is oriented to LUQ → cecal volvulus

- Elderly man + abdominal pain + severely distended abdomen + not passing BM or gas + distended colon but no obstruction on CT + non-dilated small intestines on CT → Ogilvie syndrome aka colonic pseudo-obstruction
        - S/sx of colon obstruction but no actual obstruction on imaging!
    - Tx? NPO + nasogastric tube decompression + rectal tube decompression
        - If refractory (> 48h) → neostigmine (AChE inhibitor)

    - Etiologies:
        - **Electrolyte abnormalities** (vignette will mention **days of watery diarrhea + diuretic use for HTN**)
        - Neurologic disorders
- Pt has abdominal pain + bilious voming + not passing gas + hx of Appendectomy or C-section → small bowel obstruction
        - This pt has SBO 2/2 adhesions!
    - Etiologies of SBO?
        - **#1 MCC = adhesions (i.e. hx of surgery!)**
        - #2 = Hernias
        - #3 = malignancy

CROSS CHECKED? Yes

Ep. 164: The "Clutch" Toxicology Podcast (Drugs of abuse, overdose, withdrawal, toxidromes)

- Pt with a hx of DM found unresponsive → likely hypoglycemia
    - NBSM? Administer dextrose solution OR give glucagon injection

- Pt found unresponsive with RR = 4 and bilateral pupillary miosis. ABG with pH 7.21, PaO2 55, CO2 70 → opioid overdose
    - NBSM? Naloxone
        - NOT naltrexone

- Pt with hx of multiple eps of acute pancreatitis or calcified pancreas on imaging. Pt comes to ED with nystagmus and trouble walking. → Wernicke's encephalopathy
    - NBSM? IV thiamine (B1)
    - Triad = confusion + ophthalmoplegia + ataxia
    - What if there is amnesia + confabulation? Korsakoff's psychosis
    - Neuroanatomical association? Hemorrhagic infarction of mamillary bodies
    - Pathophys? Lack of B1 cofactor → dysfunction of transketolase enzyme (rate-limiting enzyme of nonoxidative phase of pentose phosphate pathway)
    - Patient population
        - Alcoholics
        - Anorexic
        - Hyperemesis gravidarum
        - Chronic malnutrition

- Pt on nitroprusside drip that develops metabolic acidosis with pH 7.19 and bicarb 10 → cyanide poisoning
  - Pathophys? Lactic acidosis 2/2 anaerobic metabolism
  - NBSM? Hydroxocobalamin OR amyl nitrate + sodium thiosulfate
    - CN- binds to Fe3+ (oxidized state). Amyl nitrate oxidizes hemoglobin so CN- binds. Sodium thiosulfate converts the CN- to thiocyanate, which can be excreted.

- Pt that consumes antifreeze, now complaining of flank pain radiating to the groin → oxalate nephrolithiasis 2/2 ethylene glycol poisoning
  - Other population that gets oxalate nephrolithiasis? Crohn's
  - NBSM? Fomepizole
    - Mechanism? Alcohol dehydrogenase inhibitor
    - Indications: methanol, ethanol, or ethylene glycol poisoning
  - Lactic acidosis + visual difficulty → methanol poisoning

- Respiratory depression + no pupillary findings +/- psych disorder? benzodiazepine overdose
  - NBSM? Flumazenil
    - Mechanism? GABA receptor antagonist
    - Indications:
      - Benzo overdose
      - Z drug overdose (zolpidem, zaleplon, eszopiclone)

- Body temp 103F + dilated pupils + dry red skin + suprapubic fullness → anticholinergic toxicity
  - Causes
    - Atropine
    - TCAs (also look for wide QRS on EKG, give sodium bicarb)
    - 1st gen antihistamines (e.g. diphenhydramine)
    - 1st gen low potency antipsychotics
    - Clozapine
    - Belladonna plants/Jimson weed
  - Tx? physostigmine
    - Mechanism? AChE inhibitor

- Diarrhea + miosis + sweating + lacrimation + bronchospasm → cholinergic toxidrome
  - Causes?
    - Child that takes AChE pills
    - Organophosphate poisoning
      - E.g. terrorist attack with nerve gas
  - Tx? Atropine (1st) + pralidoxime (2nd)
    - Atropine - block muscarinic receptors
    - Pralidoxime - helps regenerate AChE

- Hx of DM with gastroparesis. Pt is having muscle rigidity + temp 105F → NMS 2/2 metoclopramide
  - Tx?

        - Benzodiazepine
        - Dopamine agonist (e.g. cabergoline, bromocriptine)
    - NBSM

- Pt that was on an SSRI for a while switched to MAOI. Now with fever + myoclonus + diarrhea → serotonin syndrome 2/2 inadequate washout time
    - Causes?
        - SSRI / SNRI / TCA / MAOI
        - Trazodone
        - St. John's wort
        - Linezolid
        - Ondansetron
        - Triptans
        - Ergots
        - Tramadol
        - Ecstasy/MDMA
    - Which SSRI has the longest half life? Fluoxetine
    - Tx?
        - Benzo
        - Cyproheptadine (antihistamine with antiserotonergic properties)
    - Why diarrhea? Oversecretion of serotonin causes diarrhea
        - Recall carcinoid syndrome mnemonic (mnemonic "Be FDR")
            - Bronchospasm
            - Flushing
            - Diarrhea
            - Right-sided heart lesions

- Pt recently started on psych drug is at dinner and starts to have HA and vision changes. BP is 240/120 → hypertensive crisis 2/2 tyramine consumption while on MAOI
    - Tx? Phentolamine (reversible alpha-1 antagonist)
    - General tx for hypertensive urgency/emergency
        - Nitroprusside
        - Nicardipine
        - Clevidipine
        - Labetalol
        - Fenoldopam
    - Do **NOT** use hydralazine for hypertensive emergency

- Pt with diabetic gastroparesis has rigid UE → acute dystonia
    - Pathophys? Dysfunction of nigrostriatal pathway (extrapyramidal symptom)
    - Tx?
        - Diphenhydramine
        - Benztropine (anticholinergic)
- Pt started on antipsychotic feels really restless → akinesthesia
    - Tx? Beta blocker

- Pt started on antipsychotic now has cogwheel rigidity, trouble walking at normal pace
    - Tx?
        - Dopamine agonist (e.g. bromocriptine, cabergoline)
        - Benztropine
- Pt that's been on a psych drug for a while now has repetitive movements of the tongue → tardive dyskinesia
    - NBS? STOP the drug
    - Switch to an atypical antipsychotic

- Pt was a hx of Parkinson's. Carbidopa/levodopa dose was recently increased. Now they're having psychosis. NBS?
    - NBS? reduce dose of carbidopa/levodopa
        - If they don't tolerate dose reduction → quetiapine
            - Why? Quetiapine has weaker antidopaminergic activity
            - Adverse effect? Cataracts
- Pt with HTN + tachycardia + mydriasis → sympathomimetic toxidrome
    - Causes?
        - If nasal septum perforation → cocaine toxicity
            - Tx for HTN?
                - Alpha-1 blocker (phentolamine)
                - Alpha-beta blocker (carvedilol)
                - Benzodiazepine
        - Amphetamines
        - Benzo/alcohol withdrawal
        - Hyperthyroidism

- Pt found down at home in the winter, now with bad lactic acidosis → CO poisoning
    - Causes? Space heater use
    - Tx? Hyperbaric oxygen

- Pt going to developing country and taking malaria ppx, now hypoxic with cyanosis → methemoglobinemia
    - Pathophys? Fe2+ in Hgb is converted to Fe3+. O2 can't bind to Fe3+
    - Common drug causes
        - Dapsone
        - Primaquine
        - TMP-SMX
        - Lidocaine/benzocaine
        - Nitrates & nitrites
    - Tx? Methylene blue
    - When do we induce methemoglobinemia? To treat cyanide poisoning

- Pt with mitral stenosis and A-fib presents with bloody BMs → warfarin toxicity
    - Manifestations
        - GI bleeds: duodenal hematomas/rectus sheath hematomas

    - NBSM? Give four-factor PCC (prothrombin complex concentrate)
    - Tx for other cases
        - High INR but no sxs → stop warfarin + give oral Vit K

- Pt with psych disorder tried to overdose on something. Now LFTs are high and Cr is rising → acetaminophen poisoning
    - Pathophys? Production of NAPQI, which is toxic to hepatocytes
    - Tx? N-acetylcysteine to prevent hepatic damage
        - If within minutes → give activated charcoal
    - Other weird presentations
        - Hypoglycemia
        - Metabolic acidosis (mitochondrial poisoning → lactic acidosis)
        - Encephalopathy
- Pt that tried to overdose on something. RR = 30 and PaCO2 = 20, pH 7.51, bicarb 13 → aspirin toxicity
    - Pathophys? Respiratory alkalosis + metabolic acidosis
    - Tx? Sodium bicarb
        - Mechanism? Alkaline the urine and increases excretion of aspirin
    - Tx if very severe? dialysis

- Profound bradycardia + hypotension in pt on an antihypertensive drug → beta blocker overdose
    - Tx? Glucagon

- Pt that overdoses on a CCB. NBS? Calcium-containing agent (e.g. calcium chloride, calcium gluconate)

- Hyporeflexia + slow RR → Mg toxicity
    - NBS? calcium gluconate

- Pt is admitted for CHF exacerbation and is put on a loop diuretic. Now they're having a lot of ventricular arrhythmias → digoxin toxicity
    - Pathophys? Hypokalemia predisposes to digoxin toxicity
    - Tx? anti-digoxin Fab fragments
    - Other adverse effects of digoxin
        - Yellow vision
        - Hyperkalemia

- Reversal agents
    - Dabigatran → idarucizumab
    - Unfractionated heparin → protamine sulfate
        - Does NOT tx LMWH toxicity
    - Warfarin → Vit K or PCC

- Pt found down, unresponsive. Hx of T2DM and not being treated with insulin. → hypoglycemia
    - Oral agent with the highest risk of hypoglycemia? Glyburide (sulfonylureas)
    - Tx?
        - Give glucose (best choice)

        - Glucagon
        - Octreotide

- Pt was partying at a club and took a drug. Now with hyperkalemia + hypocalcemia + rising Cr. → MDMA (Ecstasy) use & rhabdomyolysis
    - Other problems with Ecstasy use
        - Serotonin syndrome
        - Heat exhaustion
        - Psychogenic polydipsia

- Pt is undergoing surgery and gets rigid and febrile → malignant hyperthermia
    - NBS? Dantrolene (CCB)
        - Mechanism? Ryanodine receptor antagonist
    - Inheritance? AD
    - Pathophys? Ryanodine receptor mutation → excessive Ca++ released from the sarcoplasmic reticulum

- Pt that has been on a ventilator for a while gets pancreatitis → propofol
    - Pathophys? Propofol contains a ton of lipid → hypertriglyceridemia
    - Contraindications
        - Familial hypertriglyceridemia

- Pt with Parkinson's disease presents with myoclonus + hyperthermia → MAO-B inhibitors
- Pt on a cancer drug that starts having blood clots in urine → hemorrhagic cystitis 2/2 cyclophosphamide
    - Pathophys? Acrolein metabolites
    - Prevention? Mesna

- Pt on a cancer drug with rising Cr and hearing difficulties → cisplatin
    - Prevention of renal toxicity? Amifostine
    - Renal + ototoxicity drugs
        - Aminoglycosides
        - Vancomycin
        - Ethacrynic acid

- Pt with breast cancer that now has SOB or PND → irreversible dilated cardiomyopathy 2/2 anthracyclines (doxorubicin, daunorubicin)
    - Prevention? Destrozame (iron chelator)
    - What if the pt has HER2-positive breast cancer? reversible dilated cardiomyopathy 2/2 trastuzumab

- Megaloblastic anemia in pt with alcoholism → folate deficiency
    - NOT B12 deficiency
    - Folate stores don't last as long as B12 stores

Ep 167: Rapid Review Series 21 Cardio

- **Elderly pt** passes out **while mowing lawn**. Valve path? ***aortic stenosis***
  - NBSIM? Echocardiogram (dx)
    - **Note**: NBSIM for any suspected valve path = Echo!
  - S/Sx: Systolic ejection murmur (SEM) + **radiates to carotids**
  - Where to auscultate? **RUSB at 2nd intercostal space**
  - Pathophys: "calcification of valve"
    - **Note**: Aortic stenosis in young pt's = bicuspid aortic valve

- Pathophys of MVP? "myxomatous degeneration"

- Pathophys of Aortic Dissection? "cystic medial degeneration/necrosis"

	Aortic Stenosis	**HOCM**
Age	Elderly	Young adult
Where to auscultate?	RUSB	LLSB
Murmur	SEM + radiates to carotids	SEM
Pulse	Pulsus parves et tardus ("late") d/t trouble getting blood out of ventricle (PMI…carotid)	Pulses bisferiens d/t mitral valve moving towards LVOT mid-systole ("bifid carotid pulse") = 1. small 2. big carotid pulse
Maneuvers that **increase** intensity?	▪ Rapid Squatting (↑venous return, ↑preload, ↑afterload)	▪ Valsalva (phase II) (↓preload) ▪ Standing up (↓preload)
Maneuvers that **decrease** intensity?	▪ Valsalva (phase II) (↓preload) ▪ Standing up (↓preload)	▪ Rapid squatting (↑venous return, ↑preload, ↑afterload) ▪ Handgrip (↑afterload) **Note**: both increased preload and increased afterload decrease intensity of HOCM ☺
Tx	Valve replacement	▪ Defibrillator ▪ Beta-blockers (slow HR → more time for LV to fill with blood)

- Diastolic murmur at apex? ***mitral stenosis***
  - RF: Rheumatic fever
  - **MC complication: AFib** (LA contracts against increased resistance d/t stenotic mitral valve → dilation of LA → disrupts electrical conduction pathways of LA)

    - Upper GI complication? **Dysphagia** (mitral stenosis causes dilation of LA, which compresses esophagus)

- Holosystolic murmur at apex + **radiates to axilla**? ***mitral regurgitation***

- **Mid-systolic murmur** at apex with **opening snap/click**? ***mitral valve prolapse***
    - RF? ADPKD, Marfan syndrome, Ehlers-Danlos syndrome

	Mitral Regurgitation	**Mitral Valve Prolapse**
Maneuvers that increase intensity?	▪ Handgrip (↑afterload)	▪ Valsalva (phase II) (↓preload) ▪ Standing up (↓preload) **Note**: earlier onset of opening snap/click
Maneuvers that decrease intensity?	▪ Valsalva (phase II) (↓preload) ▪ Standing up (↓preload)	▪ Rapid squatting (↑venous return, ↑preload, ↑afterload) ▪ Handgrip (↑afterload) **Note**: later onset of opening snap/click

- Diastolic blowing murmur heard at RUSB? ***Aortic regurgitation***
    - RF? Takayasu, tertiary syphilis (@vasa vasorum of aortic arch), connective tissue disorder, retrograde aortic dissection, Marfan syndrome, Ehlers-Danlos syndrome
    - Effect on Pulse Pressure? Widened pulse pressure
        - Note: wide pulse pressure in adults = aortic regurge
        - Note: wide pulse pressure in kids = PDA

- Type of LV Hypertrophy in AR? **Eccentric hypertrophy** (sarcomeres in series)
    - Eccentric hypertrophy is a/w **HFrEF**
        - Mechanism? Chronic volume overload of LV → eccentric hypertrophy → dilation of LV →systolic dysfunction → HFrEF

- Type of LV Hypertrophy in *AS?* **Concentric hypertrophy** (sarcomeres in parallel)
    - Concentric hypertrophy is a/w **HFpEF**
        - Mechanism? Pressure overload → concentric hypertrophy (sarcomeres in parallel) → result in decreased size of lumen of LV → diastolic dysfunction

- Severe sudden onset chest pain with radiation to back. Dx? ***Aortic dissection***
    - RF? **HTN**
    - S/Sx: >10 mmHg difference in BP in between arms, mediastinal widening, unilateral pleural effusion + chest pain, elevated BP
    - Dx?
        - Aortic dissection + stable pt = CTA
            - Note: contraindicated in renal insufficiency)
        - Aortic dissection + unstable pt = TTE
    - Tx

        - Stanford Type A = ascending aorta → surgery
        - Stanford Type B = does *not* involve ascending aorta → **Propranolol**
            - Do not give use hydralazine b/c it causes reflex tachycardia (causes vasodilation → results in reflex baroreceptor activation)
            - Must avoid increased heart rate b/c ↑HR = ↑shear stress on aortic valve = ↑risk of worsening aortic dissection

- IVDU + fevers + 10lb weight loss + murmur at LLSB. Dx? ***tricuspid valve endocarditis***
    - NBSIM: blood culture
    - Dx: echocardiogram
    - Tx: IV abx for 6wks
    - Etiology: **Staph aureus** (MCC IVDU endocarditis) into bloodstream, veins drain to R side of heart (tricuspid valve)
        - Vs. recent dental procedure: **Strep viridans** --> ***subacute endocarditis***
            - Increased risk with valvular issues
            - Ppx: oral amoxicillin after dental procedures
        - Vs. culture-negative: **Coxiella Burnetti**
        - Vs. + hemolytic anemia, malar rash on face: ***SLE Libman-Sacks endocarditis***
        - Vs. Strep bovis. NBSIM? Colonoscopy (*Strep bovis* bacteremia indicates colon cancer)
        - Vs. Weeks-months after valve replacement: **Staph epidermidis** (biofilm on valve)
        - Vs. recent immigration, URT w/o treatment: **GAS *Rheumatic fever***

- 70Y, heavy smoker, severe BLE pain when walking: ***PAD***
    - NBSIM: ABI – ABI <0.9 indicates PAD!
        - Vs. ABI > 1.1: ***Monckeberg arteriosclerosis*** 2/2 T2DM (calcified blood vessels)
            - NBSIM with ABI > 1.1?: toe brachial index
    - Tx: supervised walking program, **cilostazol** (PDE inhibitor leading to increased cAMP, smooth muscle relaxation), arteriography --> bypass
    - Occlusion @ Location
        - Femoral artery occlusion: pain @ thigh
        - Popliteal artery occlusion: pain @ leg
        - ***Leriche syndrome*** d/t occlusion of internal+external iliac branches of aorta + impotence, buttock pain #rip
    - RF: smoking

- Long-term smoker, past 30min severe back/abdominal pain, pulsatile abdominal mass, hypotensive: ***ruptured AAA***
    - RF: smoking
    - Dx: bedside ultrasound or CTA

- NBSIM for 65-75yo M with h/o smoking or FMHx AAA? abd ultrasound (one-time screening)
        - >5.5 cm, growing >0.5 cm/6mo or >1cm/yr, symptomatic --> surgery

- Complications of AAA surgery:
        - *AKI* d/t transient hypoperfusion of kidneys
            - AAA @ Infrarenal aorta near renal artery
        - *Anterior spinal artery syndrome* d/t infarction of Artery of Adamkiewitz
            - Sx: paraplegic/quadriplegic; all of spinal cord knocked out except dorsal columns (vibration/fine touch)

      - *Endo-leak* = did not properly exclude aneurysm --> contrast going past contours of aneurysm stent
      - *Aortoenteric fistula*
        - Sx: dropping Hgb s/p weeks or months, heme-occult positive stools

  - Bed-bound hospitalized patient, severe unilateral leg pain/tenderness: ***DVT***
    - RF: Virchow's triad = stasis, hypercoagulability, endothelial dysfunction
    - NBS and Dx: duplex scan of LE
    - Tx: heparin or IVC filter (prevent PE)

  - **Bonus!** Young male athlete who is either a pitcher or weight-lifter + sudden-onset arm swelling + arm heaviness + arm pain → **Spontaneous upper extremity** DVT
    - Tx? Throbolysis and/or 3 months of anti-coagulation

- Chest pain, ST elevations on EKG, radiation to jaw: ***STEMI***

- Acute Coronary Syndrome

	STEMI	**NSTEMI**	**Unstable Angina**
Chest pain	+	+	+
Troponin	+	+	
ST elevation	+		

  - **Note**: stable angina is not an "acute coronary syndrome"

- MI (STEMI and NSTEMI)
    - MCC death s/p 48h: **VFib**

  - Recent MI + diffuse STE + chest pain + worsened with inspiration or lying down + relieved sitting up and leaning forward. Dx? Pericarditis
    - Post-myocardial pericarditis = days after MI
    - Dressler myocarditis aka auto-immune pericarditis = weeks after MI
    - Tx?
      - NSAIDs; colchicine; steroids
      - Do not give NSAIDs or colchicine in renal failure

- NBSIM for Unstable angina? Coronary angiography

- NBSIM for Stable angina? Echo stress test
  - Echo stress test if known cardiac anomaly
  - Exercise stress test preferred vs pharmacological stress test
      - Pharm stress test = adenosine/dipyridamole/dobutamine for obese pts
      - Adenosine contraindicated in asthma or COPD
      - Dobutamine contraindicated in arrhythmias

- Short PR segment + wide QRS, palpitations. Arrhythmia? ***WPW***
  - Pathophys: Direct communication from atria to ventricles via bundle of Kent

    - Tx: **procainamide**

- Severe leg pain worse at end of day + painless ulcer **above medial malleolus**. Dx? ***chronic venous insufficiency***
    - Dx: Duplex U/S of LE
    - Pathophys: "incompetence of venous valves"
    - Sx: painless ulcer, stasis dermatitis (d/t blood pooling)
    - Tx: leg compression (Unna boots), leg elevation

- Wide-complex regular tachyarrhythmia. Arrhythmia? VTach
    - Tx
        - Pulseless VTach → defibrillation aka unsynchronized cardioversion
        - VTach + HDUS → synchronized cardioversion
        - VTach + HDS → amiodarone

Cross checked: Yes

Ep. 173: The "Clutch" Immunodeficiency Diseases Podcast

- 3 yo M with multiple Strep pneumo pneumonia + giardia infections → Bruton's agammaglobulinemia
    - Recurrent infections after 6 months old (when antibodies from mom wane)
    - Cell affected? B-cells
    - Pathophys? Mutation in tyrosine kinase that allows for B cell differentiation → no mature B cells → issues with antibody production / humoral immunity
    - Classic organisms? Encapsulated organisms (Strep pneumo, H. flu)
    - Inheritance? X-linked dominant
    - Mutated gene? BTK
    - PE findings?
        - Poorly developed tonsils
        - Tiny spleen
        - No lymphadenopathy with infections
    - Lab findings?
        - NO B cells on peripheral smear
        - Low levels of immunoglobulin
    - Tx? Monthly IVIG

- Similar presentation to Bruton's? CVID
    - Inheritance? AR or AD
    - Pathophys? Issues with B cell differentiation → low levels of immunoglobulins
    - Presentation? Boy or girl that has recurrent respiratory or GI infections after age 10
    - Alternate presentation? Pt gets pneumococcal vaccine, but still gets multiple pneumococcal infections. Check titers and they're not immune.
    - Associated problems:
        - Skin disease (e.g. alopecia, vitiligo)

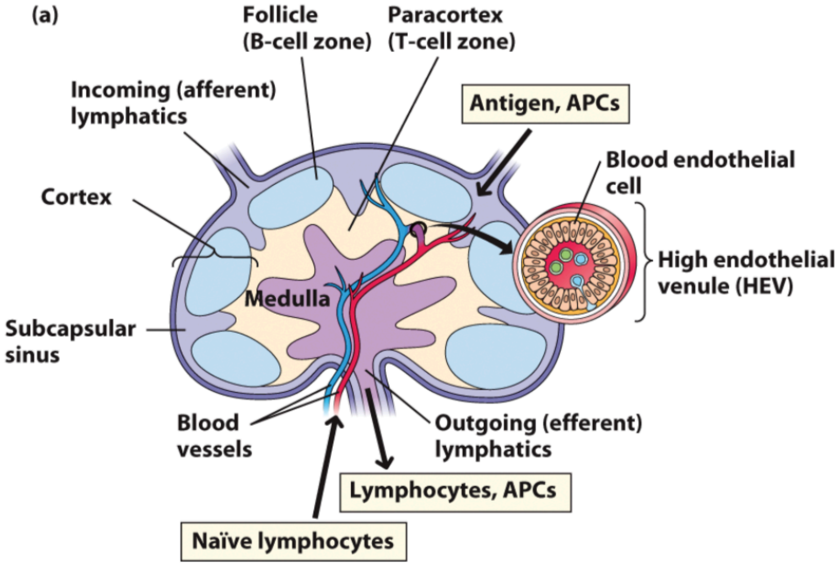
        - Autoimmune dz (e.g. ITP, autoimmune hemolytic anemia, RA)
        - Lymphoma
    - Lab findings?
        - B cells on peripheral smear
    - Tx? IVIG

- Pt getting blood transfusion that becomes hypoxia, has stridor/wheezing → IgA deficiency
    - Presentation? Recurrent respiratory and GI infections
    - Pathophys?
        - Failure of differentiation of IgA-producing B cells. Recall that IgA is the “guardian of the mucosa”
        - Since they are deficient in IgA, they can form Ab to IgA.
    - Associated problems
        - Food allergy
        - Atopic disorders
    - Lab findings?
        - Normal WBC count
        - Low IgA levels, other Ig normal
    - Tx?
        - Keep treating recurrent infections
        - Washing of blood transfusions (to remove plasma)

- Girl with progressive neurologic impaired + problems walking + telangiectasias in the skin or eye + mild ID → Ataxia-telangiectasia
    - Classic presentation? ataxia w/ negative Romberg → age 3-6 telangiectasias on skin & eye → then recurrent sinopulmonary infections
        - Freidrich’s ataxia tends to have positive Romberg
        - Use name of the disease to remember order
    - Inheritance? AR
    - Pathophys? ATM gene regulates response to ds DNA breaks → sensitivity to ionizing radiation
    - Mutated gene? ATM
    - Chromosome? 11
    - Lab testing?
        - Low WBC count
        - Low IgA level
    - Associated problems?
        - Increased risk of cancer, especially hematologic cancers

- SCID
    - Presentation? Bad infections since birth
    - Pathophys?
        - Common cause: deficiency of adenosine deaminase → apoptosis of lymphocytes
        - Another cause: Mutation in IL-2 receptor
    - Cells affected? B-cells & T-cells
    - Classic organisms? ALL (bacterial, fungal, viral)

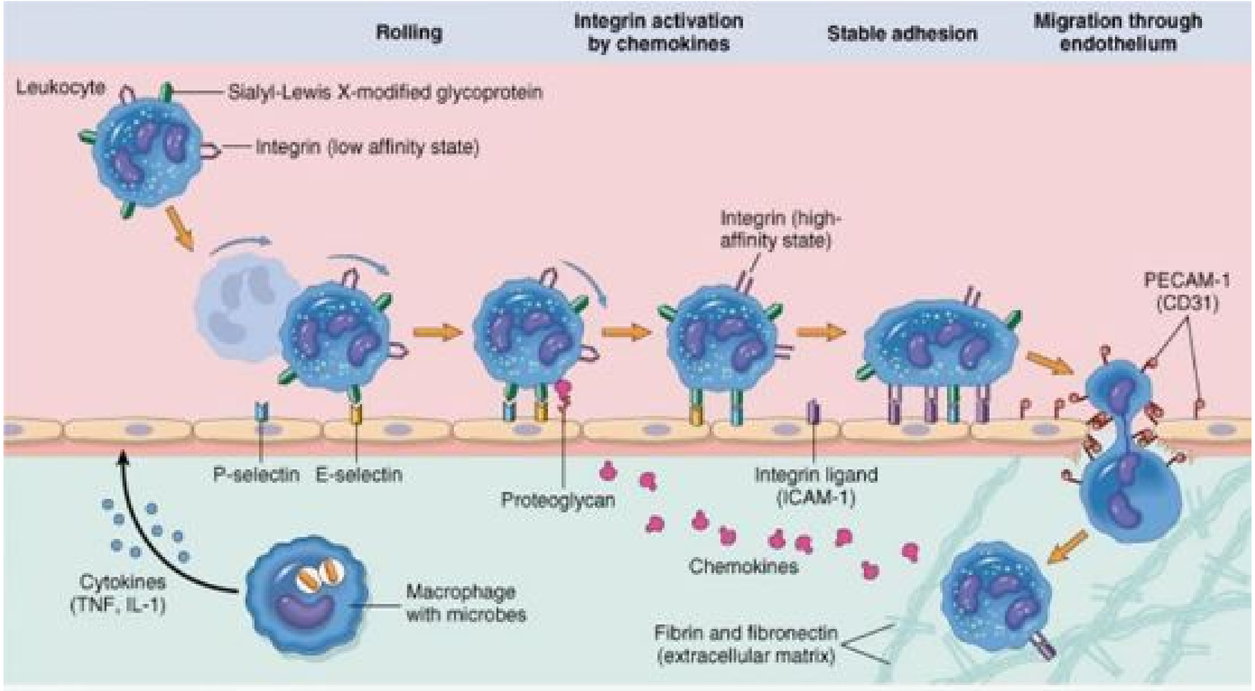
    - Inheritance? Can vary (AR, X-linked)
    - Lad findings?
        - Low WBC count
        - Low immunoglobulins
    - Imaging? Absent thymic shadow on CXR
        - Also seen in DiGeorge
    - Histology? Hypoplasia of the paracortex (T-cell zone) of lymph node
    - Tx?
        - Abx
        - Bone marrow transplant
    - Vaccination restrictions? NO live-attenuated vaccines


(a)
Follicle (B-cell zone)
Paracortex (T-cell zone)
Incoming (afferent) lymphatics
Antigen, APCs
Blood endothelial cell
Cortex
High endothelial venule (HEV)
Medulla
Subcapsular sinus
Blood vessels
Outgoing (efferent) lymphatics
Lymphocytes, APCs
Naïve lymphocytes

- Boy with petechiae on skin + platelet count 30k + eczematous lesions + recurrent infections → Wiskott-Aldrich syndrome
    - Inheritance? X-linked recessive
    - Mutated gene? WASP
    - Pathophys? WASP gene mutation → issues with signaling cascade allowing for the appropriate movement of actin filaments
    - Lab findings?
        - Thrombocytopenia
        - Tiny platelets
        - High IgE → eczema
        - High IgA
        - Low IgM
    - Associated problems?
        - Autoimmune disease

- Skin infections w/o pus + delayed separation of umbilical cord → leukocyte adhesion deficiency
    - Pathophys? Neutrophils cannot adhere to endothelium & exit the bloodstream
    - Mutated proteins? Integrins (e.g. CD-18), E-selectin, sialyl Lewis X

  - Lab findings?
    - Leukocytosis w/o signs of infection (large % leukocytes are in a demarginated state)
  - Dx? Flow cytometry


Rolling
Integrin activation by chemokines
Stable adhesion
Migration through endothelium
Leukocyte
Sialyl-Lewis X-modified glycoprotein
Integrin (low affinity state)
Integrin (high-affinity state)
PECAM-1 (CD31)
P-selectin
E-selectin
Proteoglycan
Integrin ligand (ICAM-1)
Chemokines
Cytokines (TNF, IL-1)
Macrophage with microbes
Fibrin and fibronectin (extracellular matrix)

- Pt with lymphadenopathy + recurrent Staph aureus abscesses → CGD
  - Inheritance? X-linked recessive
  - Cells affected? Neutrophils
  - Pathophys? NADPH oxidase deficiency → neutrophils cannot generate oxidative burst
  - Classic organisms? Catalase-positive
    - Staph aureus
    - E. coli
    - Candida
  - Dx?
    - Dihydrorhodamine test (DHR)
    - Nitroblue tetrazolium test (NBT)--OLD!
  - Tx? Interferon-gamma

- Recurrent infections + albinism (“diffuse skin hypopigmentation”) w/ blond hair & blue eyes + intellectual disability → Chediak-Higashi disease
  - Inheritance? AR
  - Cells affected? Neutrophils
  - Mutated gene? LYST or CHS1
  - Pathophys? Problems with intracellular protein transport → problems with transporting secretory granules to appropriate place
    - Issues with melanin granule transport → albinism
    - Issues with neutrophil granules → can’t use them to kill bacteria
  - Associated problems?

        - Hematologic malignancies
    - Lab findings?
        - Peripheral smear with giant granules in neutrophils

- Recurrent infections + no thymic shadow on CXR + hypocalcemia → DiGeorge
    - Pathophys? Failure of the 3rd and 4th pharyngeal pouches to develop
        - No thymus → T cells can't mature
        - No parathyroids → hypocalcemia → prolonged QT & seizures
    - Gene? 22q11 deletion
    - Chromosome? 22
    - Dx? FISH
    - CATCH-22
        - C = cardiac issues (e.g. tetralogy, truncus arteriosus, VSD)
        - A = abnormal facies
        - T = thymic aplasia
        - C = cleft palate
        - H = hypoparathyroidism
        - 22 = chromosome 22
    - Most common cause of death? Heart disease
    - Velocardiofacial syndrome vs. DiGeorge
        - Doesn't have the hypoparathyroidism

- Terminal complement deficiency (C5-C9) makes you susceptible to what bug? Neisseria meningitidis
    - Prevention? Neisseria meningitidis vaccine

Ep. 174: Rapid Review Series 22 (IM)

- Cattle farmer with suspected endocarditis, cultures are negative → Coxiella endocarditis
    - Also consider HACEK organisms
- Hx carcinoid syndrome, with chronic diarrhea + forgetfulness + 20/30 MMSE + skin rash → pellagre 2/2 niacin deficiency
    - Pathophys? Small bowel or appendiceal tumor makes a ton of serotonin, which requires drains tryptophan stores and niacin can't be produced
- Hx abdominal surgery, now with fevers + vomiting + no flatus + distention (SBO), suddenly loses consciousness & becomes hypotensive, imaging shows bowel contents throughout abdomen → small bowel rupture 2/2 Ehlers-Danlos
    - Pathophys? Collagen defect
    - Inheritance? AD
    - Association?
        - Aortic dissection
        - Aortic aneurysm
        - MVP
        - Intracranial aneurysms → SAH

- Pt with of hx of hereditary spherocytosis, now with MVC 110 → folate deficiency
    - Run out of folate (B9) much faster than B12
    - Associations:
        - Hx hemolytic anemia (pathophys? burn through folate stores)
            - Sickle cell disease
            - Thalassemias
        - Alcoholic
            - Pathophys? Alcohol poisons the enzymes that helps absorb B12
    - Prevention? Daily folate supplement

- 35 yo M smoked 0.5 ppd x 10 years, increased sputum production + cough, CXR with mild hyperinflation. Uncle died of liver problem → alpha-1 antitrypsin deficiency
    - Inheritance? Autosomal codominant
    - Pathophys? alpha-1 antitrypsin is antiprotease that protects lung structural proteins from degradation from proteases
    - Lung manifestation? Panacinar emphysema
    - Liver manifestation? Cirrhosis

- 53 yo M with 30 pack-year hx, fatigue for 3 months, Hgb 8, MCV 65. NBS? colonoscopy
    - Microcytic anemia in 50+ yo, NBS = colonoscopy
    - LLQ pain + fever → diverticulitis
        - Dx? CT scan with contrast
        - Colonoscopy 6 weeks after episode to r/o colon cancer
        - Do NOT do when acutely ill
- Lung cancer patient started on chemo, now has pins & needles sensation. What drug is responsible? Vinca alkaloids (vincristine, vinblastine)
    - Mechanism? Inhibit polymerization of microtubules
    - Other pharm causes of peripheral neuropathy
        - Taxanes (e.g. paclitaxel)
        - Cisplatin

- Pt on chemo for colon cancer, now with SOB + drug cough, CT scan shows increased interstitial markings → pulmonary fibrosis
    - What drug is responsible? Busulfan, bleomycin or methotrexate
    - Restrictive pattern (FEV1/FVC ratio normal or mildly increased)
    - Bleomycin
        - Mechanism: G2 phase, free radicals → strand breaks
    - Methotrexate
        - Mechanism: inhibits dihydrofolate reductase
        - If profound bone marrow suppression, NBS? Give leucovorin (folinic acid analog)

- Pt with HIV, with HA & seizures, brain MRI with multiple ring-enhancing lesions → toxoplasmosis
    - Tx? Sulfadoxine/pyrimethamine
        - Can also cause bone marrow suppression

- Pt with latex allergy. #1 RF? Healthcare worker or prolonged exposure to healthcare system
    - Type HSR? Type 1

- Type 1 HSR (IgE mediated)
    - Pathophys? Antigen binding to IgE → cross linking of IgE on mast cell → mast cell degranulation
    - Examples?
        - Anaphylaxis
        - Asthma
        - Latex allergy
- Type 2 HSR (antibody-mediated)
    - Pathophys? Antibodies against a particular antigen
    - Examples?
        - Autoimmune hemolytic anemia
- Type 3 HSR (Ab-Ag complex-mediated)
    - Pathophys? Antibody-antigen complexes accumulate & deposit
    - Examples?
        - Vasculitis
        - Serum sickness
        - Most nephrotic/nephritis
- Type 4 HSR (delayed)
    - Examples?
        - Contact dermatitis
        - Tuberculin skin testing

Ep. 175: Rapid Review Series 23 (Psych)

- Pt BMI = 16, has been vomiting, now hypotensive & HDUS → anorexia
    - NBS? Admit (even involuntarily)
    - MUST be underweight (BMI < 18.5) to make dx
    - Electrolyte abnormalities
        - Hypochloremic due to vomiting
        - Hyponatremic due to loss of electrolyte-rich fluid & hypovolemia → nonosmotic release of ADH → free water reabsorption
        - Hypokalemia due to RAAS activation
        - Alkalotic due to aldosterone effect on alpha-intercalated cell
    - If comorbid depression, consider which drug? Mirtazapine
- Binge + compensatory behavior (e.g. vomit, work out), BMI normal → bulimia nervosa
- Binge but no compensatory behavior → binge eating disorder

- BP 210/120 + pupillary mydriasis → cocaine intoxication
    - Pathophys? Sympathomimetic

        - Alpha-1 agonist → increased SVR → increased BP
    - Tx?
        - Benzodiazepine
        - Alpha + beta blocker (e.g. carvedilol)
        - Alpha-1 antagonist (e.g. phentolamine)
    - What drug should NOT be given? Beta blockers
        - Will lead to unopposed alpha

- Pt with hx Parkinson's consumes lots of cheese, wine, smoked meats and has a hypertensive crisis. Why?
    - Combination of tyramine in food & MAO-B inhibitors (e.g. selegiline)

- Pt with depression has MRSA infection and develops fever, myoclonus, & hyperreflexia → serotonin syndrome
    - Antidepressant + MAO-I activity of linezolid → serotonin syndrome

- Cocaine vs. methamphetamine intoxication
    - Both are sympathomimetics
        - Both has pupillary mydriasis
    - Meth → milder BP elevation, poor dentition, +prominent hallucinations

- 70 yo M with hx Parkinson's, parkinsonian sxs has gotten worse so you increase his meds. Now he's acting weird. → medication-induced psychosis
    - Pathophys? Pro-dopaminergic effects of Parkinson's meds
    - NBS?
        - 1st: try to lower dose of drug
        - If Parkinson's sxs come back, put back on dose that control sxs and add quetiapine

- Sxs of MDD/GAD but doesn't meet criteria (# of sxs or time) + recent stressor → adjustment disorder

- Veteran with nightmares, flashbacks, etc for 2 weeks. He acts suspicious during interview. → acute stress disorder
    - sxs for <1 month = acute stress disorder
    - Sxs for >1 months = PTSD
        - Tx for general sxs? SSRI
        - Tx for nightmares? Prazosin

- 22 yo M with episodes of tremulousness, sweating, dry mouth, feeling of loss of control. Has happened multiple times over the past few months. → panic disorder
    - Panic attack = one episode
    - Panic disorder = multiple episodes + fear of having another one
    - Tx? SSRI

- Pt with bipolar disorder in acute manic episode. NBSM?
    - Lithium + antipsychotic

- Pt with bipolar disorder diagnosed 6-7 weeks ago, has been on lithium, sxs still poorly controlled. NBSM?
  - Add atypical antipsychotic
  - E.g. lithium + quetiapine
  - Adverse effects of lithium
    - Tremors
    - Hypothyroidism
    - Nephrogenic DI
      - Tx? Amiloride or triamterene

- 41 yo M with trisomy 21, forgetting way home from store, 15/30 on MMSE → early-onset Alzheimer's
  - NT? Low ACh
  - Neuroanatomical association? Basal nucleus of Meynert
  - Deficiency of what enzyme can cause AD? Choline acetyltransferase (rate-limiting enzyme in ACh synthesis)
    - Congenital myasthenic syndrome
      - Presentation: similar to MG but doesn't improve with AChE inhibitor (e.g. edrophonium = "Tensilon test")
      - Pathophys? Choline acetyltransferase deficiency

- Cogwheel rigidity + wide gait + bradykinesia → Parkinson's
  - NT? Low dopamine
- Parkinsonism + visual hallucinations + syncopal episodes → Lewy Body dementia
  - Dementia BEFORE Parkinsonian sxs

- Pt treated with 9 months of INH for latent TB, starts to have seizures. Why?
  - INH w/o B6 (pyridoxine) → decreased activity of glutamate decarboxylase, which converts glutamate to GABA → high glutamate, low GABA → seizures

- If you suspected serotonin syndrome, what metabolite can help in diagnosis? urine 5-HIAA
- In MDD, what NT are affected?
  - Low serotonin
  - Low norepi
  - Low dopamine
- In pheo, what NT are affected?
  - High catecholamines
  - High urine metanephrines

- In Huntington's, what NT are affected?
  - Low GABA
  - Low ACh
  - High dopamine
    - Tx? Tetrabenazine

Ep. 177: Rapid Review Series 24 (OGBYN)

- 30 yo F with 15 months of infertility, BMI = 30, irregular periods → PCOS
    - Diagnostic criteria (must meet ⅔):
        - Hyperandrogenism (clinical or biochemical)
            - E.g. hirsutism
        - Polycystic ovaries on US
        - Oligo-amenorrhea
    - Tx if trying to get pregnant? Clomiphene (SERM--partial agonist on estrogen receptors in CNS, removes negative feedback → promote ovulation)
    - Tx for hirsutism?
        - OCPs
        - Spironolactone (aldosterone & androgen-receptor antagonist)
            - Inhibits 5-alpha reductase in the skin

CERVICAL CANCER

- #1 RF? HPV exposure
    - Early coitarche
    - Multiple partners
- MC cause of death in pts with cervical cancer? Renal failure 2/2 obstructive nephropathy
- Screening
    - Start at age 21 (never before age 21!!)
    - If <30 yo: Pap q3years
    - If >=30 yo:
        - Pap q3years
        - Pap + cotesting q5years **preferred**
    - Stop at 65 if multiple negative Pap smears
        - If CIN2+, need to continue past 65
    - If s/p hysterectomy?
        - For benign reasons → not needed
        - For CIN2+ → do Pap of vaginal cuff
    - If hx of HIV? Pap q1year
- Pap f/u
    - Indeterminate/inadequate sample → repeat now
    - ASCUS → reflex HPV testing or repeat Pap in 1 year
        - If hrHPV present → colposcopy
    - Atypical glandular cells → colposcopy & endometrial bx
    - If CIN2+ → colposcopy
    - ASC-H (atypical squamous cells, cannot exclude high-grade) → colposcopy
- Prevention? HPV vaccine
    - Males & females age 9-26
- HPV 16, 18, 30s → cervical cancer
- HPV 6, 11 → genital warts

- HPV 1, 2, 4 → plantar warts

- M with lower abdominal pain + urinary incontinence + new parter 2 weeks ago → cystitis
    - Tx? TMP-SMX or cipro
        - Nitrofurantoin never used in men
- Fever + flank pain + urinary sxs → pyelo
    - Dx? CT abdomen with contrast
    - Tx?
        - Ceftriaxone
        - Cipro
        - TMP-SMX
    - What if pt is diabetic & not improving on abx?
        - NBS? Another CT scan to r/o complication (e.g. emphysematous pyelo, perinephric abscess)
- UTI in pregnant woman
    - Tx for cystitis? Nitrofurantoin
    - Tx for pyelo? ceftriaxone
- UTIs associated with sexual activity?
    - Ppx abx prior to intercourse
    - Urinate after sex
- Weird diabetic infections
    - Gangrenous cholecystitis
    - Mucormycosis of face
        - Tx? Amphotericin B + aggressive debridement
    - Fournier's gangrene = necrotizing fasciitis of perineum
        - Can start with lower reproductive tract infection

- Classic uses of an amnioinfusion
    - Cord compression → variable decels
    - Treat or prevent meconium aspiration syndrome (evidence mixed!)
        - RF? Post-term fetus

- Key tests during pregnancy
    - Kleihauer–Betke test
        - Purpose: detects degree of fetal–maternal hemorrhage, used to determine dose of Rhogam after delivery to prevent Rh isoimmunization
        - Usually give Rhogam at 28 wks + after delivery
    - Fetal fibronectin
        - Purpose: used to determine probability of preterm delivery
    - Nitrazine paper test
        - Purpose: determine if the water has broken
        - Ferning pattern → fluid is amniotic fluid

Ep. 180: Hematology

- Megaloblastic anemia is anemia secondary to aberrant DNA synthesis (B12 or folate def)
- Pt w/fatigue, SOB, Hb 8, MCV 88, MCHC high → **hereditary spherocytosis**
    - Mutations in spectrin and ankyrin proteins → AD
    - RBCs lack central pallor
    - Dx: osmotic fragility test or eosin-5-maleimide test
    - Tx: Splenectomy b/c this removes the splenic macs
- Child of missionaries that takes primaquine, central cyanosis → **methemoglobinemia**
    - Can also be from sulfonamides or nitrates
    - Fe3+ iron → cannot bind oxygen → hypoxia
    - Tx: methylene blue
- 16 yo A. american kid w/severe pain in one extremity, non-palpable spleen → **Sickle Cell**
    - AR inheritance
    - Tx: opioids
    - Daily meds: hydroxyurea (ribonucleotide reductase inhibitor), penicillin prophylaxis, folate supplements
    - S. pneumo is the most common cause of sepsis in these patients!
    - Salmonella is the most common cause of osteomyelitis in these patients!
    - Painless hematuria → **renal papillary necrosis**
- Pt started TB tx, fatigued, low Hb, HCV 68 → **sideroblastic anemia**
    - Isoniazid depletes Vit. B6 → decreased ALAS → no heme synthesis
    - Basophilic stippling on blood smear
    - Can lead to seizures b/c glutamate decarboxylase needs B6 to turn glutamate to GABA
    - Other causes: B6 def, myelodysplastic syndromes (hyposegmented neutrophils and ringed sideroblasts)
- Pt comes in for surgery and is anticoagulated, platelets drop → **HIIT**
    - Can occur with reg heparin or LMWH
    - Ab from factor IV activates platelets → depletes platelets and forms clots (hypercoagulable)
    - First step = stop heparin then resume direct thrombin inhibitor (argatroban)
- Warfarin toxicity
    - Next best step = 4F-PCC (has II, VII, IX, X) NOT FFP anymore
- Valve replacements
    - Porcine valve → lasts 5 years
    - Mechanical valve → lasts 10 yrs, anticoagulate w/warfarin for life
- Pt w/ mechanical valve now has fatigue, low Hb, high LDH → hemolytic anemia 2/2 hemolysis
    - See schistocytes on smear and indirect bilirubinemia
- Pt w/ aortic stenosis, microcytic anemia, bloody stools → **Heyde Syndrome**
    - vWF multimers are cleaved so primary hemostasis does not happen → GI bleeds
- **Platelet disorders:**
    - vWD → no vWF → heavy menses, bleeding gums
        - AD inheritance, increased bleeding time, increased PTT, positive ristocetin
        - Tx: desmopressin → increases vWF release from endothelial cells
    - Bernard-Soulier Syndrome → Gp1b3
        - Positive ristocetin, normal PTT, increased bleeding time
    - ITP → Ab against Gp2b3
        - Elevated bleeding time, isolated thrombocytopenia, normal ristocetin
        - Type 2 hypersensitivity reaction
    - Antithrombin 3 deficiency → hypercoagulability

        - Factor X and XII work unopposed
        - Give heparin w/o increase in PTT
        - Thrombosis of a random vein b/c of kidney dz
    - Protein C and S deficiency → hypercoagulable
        - Cannot neutralize factor VIII or V
    - Factor V Leiden → Factor V resists degradation by protein C
        - Dx: Activated protein C resistance assay
        - Most common, forms lots of clots
    - Antiphospholipid Ab syndrome → many miscarriages b/c of uteroplacental artery thrombosis
    - Prothrombin G20210a → overproduces factor II
        - Increased production of clots
- **Hemophilia**
    - A → XLR, Factor VIII deficiency, normal PTT, long bleeding time (< mistake?)
    - B → XLR, Factor IX deficiency, elevated PTT, normal bleeding time
    - C → AR, Factor XI deficiency, elevated PTT
- **Hypofibrinogenemia** → hypercoagulable
    - AR mutation in fibrinogen genes
    - Form clots b/c you won't form fibrin → no clot breakdown

These are my personal notes from when I originally listened to the podcast. I apologize for anything I overlooked or any mistakes!

Cross Checked: No

Ep. 181: Comprehensive NBME Emergency Medicine Shelf Review Series 1

- Pt with CKD 2/2 FSGS with sudden, severe CP and palpitations. HR 125. CP is worse with deep breath → pulmonary embolism
    - Pathophys? Pts with nephrotic syndrome lose AT-III in the urine, so they're hypercoagulable
    - Risk factors? Virchow's triad
        - Stasis
        - Hypercoagulability
        - Endothelial injury
    - Associations:
        - Malignancy (especially mucin-secreting malignancies)
        - Nephrotic syndrome
        - Genetic hypercoagulable states
            - Factor V Leiden
            - Prothrombin 20210 Mutation
        - Antiphospholipid antibody syndrome
    - Classic presentation? Pleural CP + SOB
    - Lab findings?
        - Respiratory alkalosis (2/2 hyperventilation)
        - Hypocalcemia (negative charges bind Ca++)

        - Increased A-a gradient
    - MC EKG finding in PE? Sinus tachycardia
        - Other findings?
            - New RBBB
            - S1Q3T3 (uncommon)
    - Risk stratification done with Well's score
        - <= 4 → low-risk → order d-dimer
            - If d-dimer negative, then discharge
            - If d-dimer positive, proceed to CT angio
        - >5 → high-risk → straight to CT angio
    - Dx?
        - CT angio w/ contrast
            - Avoid in pts with CKD
            - Acceptable in pregnancy if V/Q scan isn't an option
        - V/Q scan
    - Gold standard test? Pulmonary angiogram (BUT NOT DONE!)
    - Classification of PE
        - R heart strain → submassive PE
        - HDUS (SBP < 90, required pressors) → massive PE
    - Tx?
        - Heparin
            - Unfractionated heparin ONLY in renal failure pts
        - Submassive PE w/ mild sxs → just heparin
        - Submassive PE w/ severe sxs → tPA
        - Massive PE → tPA
        - Embolectomy if:
            - Contraindications to tPA
            - tPA was administered & pt continues to deteriorate
    - Long-term tx?
        - If unprovoked → chronic anticoagulation (warfarin, factor X inhibitors, direct thrombin inhibitor)

- Sudden-onset, severe flank pain in pt with nephrotic syndrome → renal vein thrombosis
    - Strongest association with which nephrotic syndrome? Membranous nephropathy
- Pt with hx DVT that gets a stroke → some connection b/t R and L heart
    - E.g. PFO, ASD
- Woman that just delivered baby that becomes comatose and is bleeding from IV sites → amniotic fluid embolism
- Pt that goes scuba diving and rises quickly → air embolism
    - Pathophys? Gas solubility rises with high pressures. When you come up rapidly, pressure rapidly decreases and nitrogen undissolved. Nitrogen bubbles can occlude blood vessels.
- Pt that recently had an IV placed has SOB & CP → air embolism
- Pt with recent fracture or orthopaedic surgery procedures now with SOB → fat embolism
    - Pathophys? Fat in the bone marrow gets into the bloodstream
    - Presentation? Hypoxia + petechiae + AMS

- Unilateral leg pain & swelling → DVT
  - Dx? LE doppler
  - Tx? Heparin

- 35 yo M with palpitations, home meds include methimazole, EKG with narrow-complex tachyarrhythmia, spaces b/t QRS complexes are not constant → Afib
  - EKG findings? Irregularly irregular rhythm
  - Tx? AV nodal blocking agent
    - Beta blockers
    - Nondihydropyridine CCBs
  - Management of HDUS pt with Afib?
    - Synchronized cardioversion = direct current cardioversion = direct current countershock
  - Management based on duration of sxs?
    - Symptomatic for <48 hrs → synchronized cardioversion
    - Symptomatic for >48 hrs or unknown
      - Start anticoagulation, TEE, cardiovert if no clot in LA
      - Warfarin for 3 weeks, TEE, then cardiovert
  - Complications?
    - Embolic stroke
  - Long Term anticoagulation? caclulate stroke risk with CHA_2DS_2-VASc
    - Options for anticoagulation
      - Warfarin
      - Factor Xa inhibitors
      - Direct thrombin inhibitors
  - Reversal agents
    - Heparin → protamine sulfate
    - Warfarin → 4-factor PCC for life-threatening bleed
    - Factor Xa inhibitors → andexanet
    - Dabigatran → idarucizumab
  - Rhythm control drugs?
    - Amiodarone
    - Propafenone

- Pt that ran marathon yesterday, now with malaise and palpitations. EKG with peaked T waves. → hyperkalemia 2/2 rhabdomyolysis
  - Pathophys? Myocyte necrosis → release intracellular K+
  - Other causes of hyperkalemia:
    - Tumor lysis syndrome
    - Missing dialysis
  - EKG findings in hyperkalemia (as it increases)
    - Peaked T waves
    - Wide QRS
    - Sine wave
    - V-fib

    - First step in management? calcium gluconate
    - Tx?
        - Insulin + glucose
            - Drives K+ into cells
        - Albuterol
            - Drives K+ into cells
        - Fluids + furosemide
            - Capitalize on K-depleting properties
        - Kayexalate = sodium polystyrene sulfonate
            - Reduce total body K+

- Pt with depression taking imipramine. Notice wide QRS on EKG. → TCA toxicity
    - First step in management? Sodium bicarb

- Hypokalemia EKG findings?
    - U waves
    - Prolonged QT
- Hypocalcemia EKG findings?
    - Prolonged QT
- Hypercalcemia EKG findings?
    - Short QT
- Hypomagnesemia EKG findings?
    - Prolonged QT

- Digoxin causes what electrolyte abnormality? Hyperkalemia
    - Pathophys? Inhibits the Na+-K+ ATPase pump, so prevents K+ from getting in the cell
    - BUT hypokalemia predisposes to digoxin toxicity
        - Digoxin binds to K+ binding sit on Na+-K+ pump
        - Hypokalemia → more spots for digoxin to bind

    - If person has K+ abnormality, don't give them digoxin
- Pt with CHF on diuretic comes in with CHF exacerbation c/b cardiogenic shock. Pt is given digoxin and they get lots of PVC and dies. → pt had hypokalemic 2/2 diuretic and was susceptible to digoxin toxicity

- QT-prolonging drugs
    - Azithromycin
    - Haloperidol
    - Many antipsychotics

- Prolonged QT → Torsades → sudden cardiac death
    - Tx of Torsades? IV mag

- Hypocalcemia refractory to appropriate repletion → hypomagnesemia
    - Tx? Replete Mg then other electrolytes can be repleted

- Corrected Ca+
    - Every 1 mg/dL drop in albumin reduces Ca+ by 0.8

- Pt with K+ 8, but no sxs and no EKG findings → likely hemolyzed sample
    - NBS? Repeat lab draw

- Hypercalcemic crisis
    - First step in management? Give NS

- Pt with severe, sudden-onset CP. Profoundly hypoxia, BP 40/palp, +JVD. Central line was recently placed. → tension pneumothorax
    - NBS? Needle decompression
        - 2nd intercostal space in midclavicular line
        - 5th intercostal space in the mid-axillary axillary line
    - Tx? Chest tube
    - PE finding? Unilateral decreased breath sounds, hyperresonant to percussion

:

- Primary spontaneous pneumothorax
    - Population? Tall thin male
    - If <20% size hemithorax → can observe pt for 6 hours → repeat CXR → if unchanged or decreasing → send home
    - Tx if large or worsening? Chest tube

- Pt that recently had EGD. 3 hrs after procedure pt is complaining of CP. Subcutaneous emphysema present. CXR with black line outlining mediastinum → esophageal perforation
    - Dx? gastrografin (water-soluble contrast) esophagram
        - Leaked barium can cause mediastinitis
    - Tx? Surgical repair
    - Populations?
        - Alcoholics
        - Bulimics

HYPERTENSIVE SCENARIOS

- Hx scleroderma, BP is very high, pt complaining of HA & vision changes → hypertensive emergency
    - Signs/sxs end organ damage → hypertensive emergency
        - HA
        - Vision changes
        - Abdominal pain
    - BP > 180/110 without sxs → hypertensive urgency
    - Tx for hypertensive urgency/emergency
        - Labelol
        - Esmolol
        - Nitroprusside
            - Adverse event? Cyanide toxicity
                - Tx? Amyl nitrate + thiosulfate OR hydroxocobalamin

        - Nicardipine
        - Clevidipine
        - “Observing LENT in North Carolina”
    - How fast to lower BP? Not by >25% in 1st hour
- BP 210/150. Pt complaining of WHOL. → SAH
    - NBS? NCCT
    - If NCCT negative, do LP → look for xanthochromia
        - Will be thousands of RBCs
    - Contrast with meningitis, which will have a less sudden onset
    - Other causes of RBCs in CSF? HSV (hundred of RBCs)
    - Pathophys? Rupture of berry aneurysm, most often in ACom
    - Tx?
        - Lower BP with labetalol or nicardipine
        - Give nimodipine to prevent post-SAH vasospasm
        - Phenytoin/fosphenytoin for seizure ppx
        - If rapidly increasing ICP, can ventilate pt and hyperventilate them
            - Hyperventilation is fastest way of relieving increased ICP

- Pt with long hx of uncontrolled HTN that presents with sudden-onset, severe tearing CP that radiates to the back.
    - Pathophys? Cystic medial necrosis/degeneration
    - Other cause of aortic dissection?
        - Marfan’s
        - Ehlers-Danlos
        - Syphilis (destroys vasa vasorum)
        - Bicuspid aortic valve
    - First step? Give beta blocker
        - Alternative: nitroprusside
    - Imaging? Widened mediastinum on CXR
        - Also seen in anthrax hemorrhagic mediastinitis
    - Dx?
        - If stable → CT angio w/ contrast
        - If HDUS → TEE
    - Tx?
        - Stanford type A (ascending involved) → surgery
        - Stanford type B (descending aorta only) → medical management
    - Complications
        - Extension of proximal dissection → occlusion of RCA → inferior MI

- Pt with hx thyroid problems. Gets CT scan with IV contrast. On the 2nd day after the scan, the pt is markedly tachycardia, mild HTN, temp 103F, AMS → thyroid storm
    - Causes?
        - Hx hyperthyroidism (especially if missed meds)
        - Iodinated contrast
        - Amiodarone

  - Lab findings?
    - TSH low
    - T3/T4 high
  - First step? Propranolol
    - Blocks conversion of T4 → T3 in the periphery (inhibits 5'-deiodinase)
  - Second step? PTU
    - Also blocks peripheral conversion
  - Third step? Wait 1 hr then give Lugol's solution (supersaturated solution of potassium iodide)
    - Inhibits production of new thyroid hormone via the Wolff-Chaikoff effect
    - Iodine load prevents organification step in thyroid hormone synthesis
  - Fourth step? Can give dexamethasone/hydrocortisone
    - Prevents development of adrenal insufficiency
  - MC arrhythmia in thyroid storm? Afib

- Pt with neck mass. Multiple relatives that died from thyroid cancer. Pt has episodes of severe HA & very high BPs (SBP ~ 250) → pheochromocytoma 2/2 MEN2
  - Inheritance? AD
  - Mutated gene? RET
  - First step? Block alpha receptors
    - phenoxybenzamine (irreversible)
    - Phentolamine (reversible)
    - Labetalol (alpha-beta blocker)
  - Second step? Block beta
  - Associated syndromes?
    - VHL
    - MEN2A/B
    - NF-1

- Pt with hx depression, taking MAO-I. Goes to restaurants and during meal starts to feel altered. SBP 250. → tyramine crisis
  - List of MAO-Is
    - Phenelzine
    - Tranylcypromine
    - Isocarboxazid
  - Tx?
    - Phentolamine
    - Labetalol

- Pt with hx IVDU presents with fevers. New murmur present at LLSB. → tricuspid endocarditis
  - Embolic phenomena on exam
    - Osler's nodes
    - Janeway lesions
  - First step? Draw blood cx
  - Dx? TEE to look for vegetations
  - Empiric tx? Vancomycin (cover MRSA)

ACUTE CORONARY SYNDROMES

- Pt comes into ED with 2-weeks of CP that occurs when they walk 2 blocks. Pain goes away with rest → stable angina
    - Stable angina is NOT an ACS
    - Do NOT need to take this pt to cath lab
    - NBS? Refer for stress test
- Pt with hx stable angina, but now sxs are worsening. Now has CP at rest → unstable angina
    - EKG findings?
        - T-wave inversions
        - ST depression
    - Troponin? NORMAL
- NSTEMI
    - EKG findings?
        - T-wave inversions
        - ST depression
    - Troponin? elevated
- STEMI
    - EKG findings?
        - ST elevation
    - Troponin? Elevated
- Risk stratification
    - HEART score
        - Predicts 6-week risk of major adverse cardiac event
    - TIMI score
        - Estimates mortality for patients with unstable angina and non-ST elevation MI
- Leads & vessel relationships
    - Inferior leads (II, III, aVF) → RCA infarct
    - V1-V4 → anterior septal infarct → LAD
    - V5-V6 → lateral wall infarct → LCX
    - New heart block → RCA infarct
        - RCA supplies AV node
- Drug contraindicated in RCA infarct? Nitrates
    - Pathophys? These pts are preload dependent. Nitrates are venodilators, so giving nitrate would take away their preload → cardiogenic shock
- Other pts that shouldn't get nitrates? Pts take PDE-inhibitor
    - E.g. sildenafil for erectile dysfunction
- ACS management
    - First diagnostic step? Get EKG
    - Hyperacute T waves → ST depressions/elevations → Q waves
    - First therapeutic step? give 324 mg aspirin within 10 minutes of arrival
        - Has a mortality benefit
    - Dx?

        - Troponins
            - Repeat 6 hrs later
        - CK-MB for reinfarction
            - Troponin takes 7-10 days post-MI to fall
    - Initial Tx?
        - 324 mg aspirin ASAP
        - P2Y12 blockers/ADP receptor blockers (e.g. clopidogrel, prasugrel, ticagrelor)
        - Unfractionated heparin
        - For pain:
            - Nitrates
            - Morphine
        - O2 therapy
        - If going for PCI → GpIIbIIIa antagonists (e.g. eptifibatide, tirofiban, abciximab)
    - Definitive Tx?
        - PCI
            - Door-to-balloon time <90 minutes
        - If at hospital w/o PCI:
            - PCI-capable center <2 hrs away → transport
            - PCI-capable center >2 hrs away → consider thrombolytics (tPA)
                - Can give up to 12 hrs after onset of sxs
        - If L main disease or triple-vessel disease → CABG
            - Arterial graft > venous graft
            - Artery used? Internal mammary
            - Vein used? Saphenous
    - MONA BASH mnemonic
        - M = morphine
        - O = O2
        - N = nitrate
        - A = aspirin
        - B = beta-blocker
        - A = antiplatelets (P2Y12 blockers)
        - S = statin
        - H = heparin
    - Pt with cardiogenic shock 2/2 MI. NBS? intra-aortic balloon pump
        - How does it work? Inflates is diastole, prevents blood from going past it, which encourages perfusion of the coronary vessels and cerebral vessels
            - Recall that coronary vessels fill during diastole
    - Discharge meds for pts with recent MI
        - Beta blocker
            - Avoid in: decompensated HF
        - ACE-I
        - High-intensity statin
        - Aspirin
        - If stent → give dual antiplatelet therapy (e.g. aspirin + clopidogrel)
- MI complications

    - Pt with MI 3 days ago. Now with flash pulmonary edema & new holosystolic murmur at LLSB → interventricular septal rupture
    - Pt with MI 3 days ago with flash pulmonary edema. Echo shows lots of mitral regurg but normal ventricular size → acute mitral regurg 2/2 papillary muscle rupture
        - Contrast with chronic mitral regurg, which will caused volume overload and systolic dysfunction
    - Pt with recent MI that becomes responses. +JVD and BP 60/palp. Difficult to hear heart sounds → free wall rupture
        - Often presents as tamponade
        - Beck's triad = JVD + hypotension + muffled heart sounds
    - Pt with hx MI s/p PCI 7 days ago. Noticed blue toes and petechiae on lower extremities. Elevated Cr. → blue toe syndrome/cholesterol embolization syndrome
        - Classic after cardiac catheterization
        - Pathophys? When stenting open vessels, cholesterol can embolize and obstruct small arteries in kidneys and LEs
        - Alternate PE finding? Livedo reticularis
    - Pt s/p PCI a few hours ago. Access was established through the femoral artery. Pt is profoundly hypotension and complaining of severe back pain. → RP bleed
    - Pt is progressively hypotensive immediately after PCI → cardiac tamponade 2/2 puncture during PCI
        - NBS? Surgery
    - Pt with MI 3 days ago, presenting with sudden-onset severe abdominal pain → acute mesenteric ischemia
        - Dx? Mesenteric angiography
    - Pt with recent MI s/p PCI, presenting with severe LE pain → acute limb ischemia
        - NBS? Heparin
        - Dx? LE arteriography
        - Tx? Vascular surgery
    - Pericarditis a few days after MI → fibrinous pericarditis
    - Pt with MI 6 weeks ago, now presenting with CP better with leaning forward → Dressler's syndrome = autoimmune pericarditis
        - EKG findings? Diffuse ST elevations & PR depressions
        - Tx? NSAID + colchicine
            - If renal insufficiency → consider steroids
            - Colchicine is better than steroids, but it decreases the recurrence risk (whereas steroids increase it)
    - MC cause of death with 24 hrs of MI? V-fib
- Pt with multiple episodes of CP that tend to happen at night. Pt has ST elevations & troponin elevations but no occlusion found in cath lab → Variant angina = Prinzmetal angina
    - Tx? CCB → diltiazem or amlodipine
    - Contraindicated meds? Sumatriptan (causes vasoconstriction)

ARRHYTHMIAS

- Definition of prolonged QT?
    - QTc > 440ms in men or > 460ms in women

    - QTc = QT/sqrt(RR interval)
- Things that prolong the QT interval
    - Electrolyte abnormalities
        - Hypokalemia
        - Hypocalcemia
    - Antibiotics
        - Azithromycin
        - FQ
    - Antiarrhythmics
        - Class Ia: procainamide, quinidine
        - Class III: amiodarone, sotalol
- Congenital long QT
    - Romano-Ward
        - Inheritance? AD
        - Get ventricular tachyarrhythmias
    - Jervell and Lange-Nielsen syndrome
        - Inheritance? AR
        - Congenital hearing loss
    - Tx of congenital long QT?
        - 1st line: beta-blocker for life
            - Prevents sympathetic discharge that can cause arrhythmias
        - ICD to shock them out of ventricular tachyarrhythmias
- Common cause of inappropriate ICD discharge? Magnet exposure
    - E.g. MRI scan
    - Tx? Use magnet to disable device, cardiology will have to reset it
- Young pt complaining of palpitations. EKG shows a short PR interval, delta wave, and wide QRS. → Wolf-Parkinson-White
    - Pathophys? Antidromic atrioventricular reentrant tachycardia (AVRT)
    - Pathway? Signal goes down Bundle of Kent to ventricles, then up the AV node to the atrium
    - Tx? Procainamide
        - Adverse event? Drug-induced lupus (anti-histone Ab)
    - Contraindicated meds? AV blocking agents
        - Beta-blocker
        - Verapamil or diltiazem
        - Digoxin (muscarinic receptor agonist)
    - Contrast with orthodromic AVRT
        - Pathway? down the AV node to ventricles then up the accessory pathway
        - EKG findings? Narrow QRS
- Heart blocks
    - 1st degree AV block
        - Prolonged PR interval, no dropped beats
    - 2nd degree Mobitz I = Wenckebach
        - Progressively prolonging PR interval, then dropped beat
    - 2nd degree Mobitz II
        - Fixed PR interval w/ dropped beats

        - High risk of progressing to 3rd degree
    - 3rd degree
        - No relationship b/t P waves and QRS complexes
        - P-P intervals and R-R intervals are constant
    - When are pacemakers indicated?
        - Mobitz II or 3rd degree
    - Acute tx?
        - Transcutaneous pacing
        - Atropine
- Pt with regular narrow-complex tachyarrhythmia → SVT
    - Narrow complex because it arises from above the ventricles
        - Exception: SVT w/ aberrancy can be wide
    - NBSM?
        - Vagal maneuvers
        - Adenosine - stops conduction down AV node
            - 3 doses: 6 mg → 12 mg → 12 mg
    - If above fails, do what? Attempt to control HR
        - Beta blocker
        - Verapamil or diltiazem
    - If pt with SVT is HDUS? Proceed to synchronized cardioversion
        - Avoids R on T phenomenon (shock while the ventricles are depolarizing can throw the person into Torsades → V-fib)
    - Which rhythms are treated with unsynchronized cardioversion (defibrillation)?
        - V-fib
        - Pulseless V tach
- Sawtooth pattern → atrial flutter
    - Often seen best in leads II, III, aVF
- 3 or more different P wave morphologies → multifocal atrial tachycardia
    - Population?
        - Pt with COPD
    - Tx?
        - Stop smoking
        - Verapamil or diltiazem
- Regular wide-complex tachyarrhythmia → ventricular tachycardia
    - If no pulse → initiate ACLS
        - Epi / amio / epi / amio every 2 minutes
    - If pulse & HDUS → synchronized cardioversion
    - If stable → amiodarone
        - 2nd line: lidocaine
- Management of PEA or asystole? Chest compressions + epi

VALVULAR DISORDERS

- Athlete brought to ED because he collapsed during basketball game? HOCM
    - Inheritance? AD
    - Mutated proteins? Sarcomere proteins (e.g. beta myosin heavy chain)

    - HOCM murmur
        - Best heard at LLSB
        - Does not radiate
        - Pulsus bisferiens (small upstroke then big upstroke)
        - Increase preload → increase EDV → reduce LVOT obstruction → softer
        - Increase afterload → increase EDV → softer
    - AS murmur
        - Best heard at RUSB
        - Radiates to carotids
        - Pulsus parvus et tardus
        - Increase preload → increased EDV → more flow across stenotic valve → murmur louder
    - Tx of HOCM?
        - Beta-blocker
            - Mechanism? More time in diastole → increased filling
        - If arrhythmias → place ICD
- Pt with Marfan's has murmur with midsystolic click → MVP
    - Pathophys? Myxomatous degeneration of valve
- Holosystolic murmur at apex that radiates to axilla → mitral regurg
    - Complication? Volume overload → systolic dysfunction
    - Cause of acute MR? Papillary muscle rupture
- Systolic ejection murmur at RUSB, radiates to carotids → aortic stenosis
    - Cause of early AS? Bicuspid aortic valve
- "Blowing" diastolic murmur heard best at LSB + wide pulse pressure → aortic regurg
- Holosystolic murmur at LLSB → VSD
    - Cause in adults? Interventricular septal rupture after MI

- Pt with hx CHF with crackles, JVD, hepatomegaly, LE edema. Hypervolemic hypernatremia. → CHF exacerbation
    - Triggers?
        - Nonadherence to meds
        - Missing dialysis
        - Metabolic stress (like infection)
    - R heart failure
        - Hx COPD causing cor pulmonale or CF
        - +JVD, +hepatomegaly, +LE edema
        - No crackles
        - Elevated CVP
        - Normal PCWP (proxy for LA pressure)
    - L heart failure
        - All signs of R heart failure + pulmonary edema
        - PCWP > 18 mmHg
    - Tx for dyspnea?
        - Nitroglycerin
            - Mechanism? Venodilator that decreases preload → reduces myocardial O2 demand

        - Furosemide (loop diuretic)
            - If not responding adequately? Add thiazide
        - If pt is still dyspneic? NIPPV = non-invasive positive pressure ventilation (e.g. BiPAP)
            - Mechanism? Decreases WOB by keeping alveoli open. Also increases intrathoracic pressure, so decreases preload.
    - Tx of cardiogenic shock in s/o CHF exacerbation? inotropes
        - Dobutamine
        - Milrinone (PDE-inhibitor, "inodilator")
            - Mechanism? PDE inhibitor → increased cAMP → increased cardiac contractility & vascular SM relaxation
    - Young pt with URI sxs a few days ago. New S3 heart sound. +JVD. Pulmonary edema on CXR. Echo shows global enlargement of ventricles → viral myocarditis
        - Virus? Coxsackie B
        - Idiosyncratic exam finding? Tachycardia not proportionate to fever
        - Treat like a CHF exacerbation

- Syncope
    - Young pt that was sweating & pale, then passed out → vasovagal syncope
    - No prodrome, pt loses consciousness, comes back quickly w/o sequelae → cardiogenic syncope
        - Likely due to dangerous arrhythmia
    - Pt with neuro deficit or postictal period → neurogenic syncope (seizures or stroke)

Ep. 182: Comprehensive NBME Emergency Medicine Shelf Review Series 2

- Pt with 2 days of n/v, not eating well. Glucose 300, bicarb 5. Na+ 130. → DKA
    - Pathophys of DKA?
        - Absolute insulin deficiency → no inhibition of glucagon → glucagon stimulates production of ketone bodies
        - Often type 1 diabetics (no insulin)
        - Type 2 diabetics have enough insulin to inhibit glucagon
    - Dx?
        - Ketone bodies (e.g. acetoacetate, beta-hydroxybutyrate)
            - Other causes?
                - Starving
                - Hyperemesis gravidarum
                - Alcoholics
    - Electrolyte abnormalities?
        - Pseudohyponatremia = actual Na+ is normal, but measured Na+ is low due to very high glucose
            - Add 1.6 to Na+ for every hundred of glucose above 100
            - Corrected Na+ = 1.6 x (glucose - 100)/100
            - Tx? Will correct itself as you treat DKA/HHNS

        - Hyperkalemia on labs BUT depleted total body K+
    - Tx?
        - 1st: Fluids
            - 2 L bolus of NS @ 1 L/hr
            - Then switch to 0.45% NS
        - 2nd: Insulin
            - Potassium requirements for insulin therapy
                - K+ must be ABOVE 3.3
                - If between 3.3-5.3 → add potassium to fluids
                - If > 5.3 → don't need to add potassium
            - Type of insulin? IV Regular insulin (rapid acting)
            - Rate? 0.1 u/kg/hr
            - When to add dextrose? When glucose is <200
            - When to begin SQ insulin?
                - HHNS: Glucose 200-250
                - DKA: AG <=12 & glucose 200-250
            - When to turn off insulin infusion? 2 hrs after starting SQ insulin
            - Consequence of lowering glucose too fast? Cerebral edema
        - Give bicarb? NO! Not good evidence for this

DKA	HHNS
Very low bicarb Ketone bodies present T1DM	Normal or near-normal bicarb No ketones T2DM

- Causes of hypoglycemia
    - Injecting insulin → insulin high, C-peptide low
    - Sulfonylurea use → insulin high, C-peptide high, (+) sulfonylurea screen
        - Mechanism? Block ATP-dependent K+ pump → depolarization → Ca+ rushes in → release insulin
    - Insulinoma → insulin high, C-peptide high, (-) sulfonylurea screen

- Pt with DM that was working out, found down. Likely hypoglycemic episode. NBS?
    - 50% dextrose solution, then feed
    - If no IV access? IM glucagon
    - Special considerations for hypoglycemia 2/2 sulfonylurea? Observe for 24 hrs + give octreotide (to shut down further insulin release)
        - Why? sulfonylureas have long half-lifes so they can have another hypoglycemia episode

- Pt with hypoglycemia + hyponatremia + hyperkalemia + metabolic acidosis → adrenal crisis
    - Can have similar presentation to DKA (except for glucose)
    - Example presentations
        - Pt with autoimmune dz on steroids that runs out of medication

        - Pt that takes steroids for severe COPD or asthma and then has infection that imposes metabolic stress
        - Pt that undergoes surgery w/o stress-dose steroids
        - Pt with hx other autoimmune disease with new-onset Addison's disease
        - Pt with meningitis, now hypotensive + hyperkalemia + hyponatremia (Waterhouse-Friedrichson syndrome)
    - CBC findings? Eosinophilia
        - Pathophys? Corticosteroids cause eosinophil apoptosis
    - Dx?
        - Morning cortisol + ACTH
            - Both low → secondary adrenal insufficiency (anterior pituitary)
            - Elevated ACTH + low cortisol → primary adrenal insufficiency
    - Why skin hyperpigmentation with PIA?
        - ACTH is made from POMC, which is also the precursor to MSH + beta-endorphin. MSH stimulates melanocytes → skin hyperpigmentation
    - Tx? Dextrose + hydrocortisone
        - Hydrocortisone is better than dexamethasone because it has both glucocorticoid & mineralocorticoid properties

- Pt with hx Graves that has missed medications. Now has severe tachycardia + mild fever + diarrhea + AMS. → thyroid storm
    - Alternate presentation?
        - Pt with thyroid disorder that gets iodinated contrast
        - Pt on amiodarone
    - MC arrhythmia during thyroid storm? Afib
    - Lab findings?
        - TSH low
        - T3/T4 high
    - Tx?
        - 1st: propranolol
            - Treats hyperadrenergic sxs
            - Blocks peripheral T4 → T3 conversion (inhibits 5'-deiodinase)
        - 2nd: PTU
            - Prevents synthesis of thyroid hormone
            - Blocks peripheral T4 → T3 conversion
        - Wait 1 hr
        - 3rd: Then start Lugol's solution = SSKI
            - Uses Wolff-Chaikoff effort to prevent production thyroid hormone
        - 4th: Give hydrocortisone
            - Treats adrenal insufficiency
            - Also prevents peripheral T4 → T3 conversion

- Pt with hx some autoimmune disease (e.g. vitiligo, pernicious anemia, Addison's) that is profoundly bradycardic + hypothermia + decreased DTRs + periorbital edema or generalized non-pitting edema → Myxedema coma

    - Lab findings?
        - TSH elevated
        - T3/T4 decreased
    - Tx? Levothyroxine (T4) + hydrocortisone, at least until PIA is ruled out
        - If hyponatremic → give NS
        - If hypoglycemic → give dextrose
        - If very sick → give liothyronine (T3)

- Postpartum woman with failure to lactate. Delivery was c/b hemorrhage. May have signs/sxs hypothyroidism as well. → Sheehan's syndrome
    - Pathophys? Ischemic stroke of the pituitary. Anterior pituitary undergoes massive hypertrophy during pregnancy so it's susceptible to infarction.
    - Dx? TRH stimulation test
        - Failure of prolactin to rise → pituitary insufficiency

- Pt with sudden HA or visual field deficits. Adrenal insufficiency sxs. → pituitary apoplexy
    - Population at risk? Pts with pituitary adenomas
    - Pathophys? Hemorrhagic stroke of pituitary ("SAH of pituitary")
        - Why vision changes? Compression of optic chiasm by enlarging pituitary
    - Tx? Replace hormones as necessary

Ep. 183: Comprehensive NBME Emergency Medicine Shelf Review Series 3

- Young man presents with penile discharge or testicular pain + mild fevers. Penile swab obtained and no organisms seen on microscopy → chlamydia
    - Possible sxs?
        - Urethritis
        - Epididymitis
            - Young pt → CT/NG
            - Old pt → E. coli
        - Non-purulent discharge in women
        - Cervical motion tenderness/adnexal tenderness → PID
        - Reiter's syndrome = reactive arthritis
            - Conjunctivitis + urethritis + arthritis
            - "Can't see, can't pee, can't climb a tree"
    - Dx? Nucleic acid amplification test (NAAT)
        - Male → urine
        - Female → vaginal swab or urine
    - Tx? Azithromycin (single dose) or doxy
- Man with similar sxs. GS with Gram-neg diplococci → gonorrhea
    - Possible sxs?
        - Urethritis

        - Epididymitis
        - Purulent discharge in women
        - Cervical motion tenderness/adnexal tenderness → PID
        - Petechial rash → disseminated gonococcal infection
    - Dx? NAAT
    - Tx? Ceftriaxone + azithro (single dose)
        - Alternative: Ceftriaxone + doxy
        - Avoid sexual contact for 7 days after abx therapy
- 24 yo F with severe tenderness and burning in vulvar area + foul-smelling greenish thin discharge + pH > 4.5 → trichomonas
    - Dx? Wet mount → motile organisms
    - Tx? Metronidazole
        - Alternative: tinidazole
- 20 yo MSM who has painless penile ulcer → syphilis
    - Primary syphilis
        - chancre (painless ulcer w/ indurated borders)
    - Secondary syphilis
        - rash on palms & soles
            - often spreads upper arms → palms
        - condyloma lata
    - Tertiary syphilis
        - Gummas
        - Tabes dorsalis (destruction of dorsal columns)
            - Issues with fine touch + proprioception
            - Positive Romberg
        - Neurosyphilis
        - Aortitis → aortic dissection
    - Sniffles in a NB → congenital syphilis
    - Dx?
        - FIRST: RPR or VDRL (non-treponemal tests)
        - THEN: FTA-Abs (treponemal tests)
            - FTA-Abs = fluorescent treponemal antibody absorption
        - Dark-field microscopy to visualize spirochetes
    - Tx?
        - Primary/secondary syphilis → IM penicillin G
            - If PCN allergic, consider doxycycline
        - Tertiary syphilis → 3 weeks of penicillin G
    - Fevers, HAs, myalgias after getting PCN tx → Jarisch–Herxheimer reaction
- 24 yo M complains of a burning sensation involving the penis. On exam, multiple vesicles on an erythematous base. → genital herpes
    - Bug? HSV-2
    - Causes of painful genital ulcer:
        - Herpes
        - Chancroid (Haemophilus ducreyi)
    - Dx?

    - PCR
    - Viral culture
  - Do NOT choose Tzanck smear (old diagnostic test)
  - Tx? PO acyclovir/valacyclovir/famciclovir
    - Do NOT need to admit for IV tx unless significant systemic sxs
    - Admit if: very high fevers, vomiting & not tolerating PO
      - Give IV acyclovir
    - If resistant to acyclovir ? Foscarnet (pyrophosphate analog)
- 24 yo M with a very painful papule on penis. On exam, single lesion that is exquisitely tender and enlarged inguinal nodes → chancroid
  - Bug? Haemophilus ducreyi
  - Tx?
    - Ceftriaxone (single dose)
    - Azithromycin (single dose)
- 24 yo F on period using tampons. Temp 103F, BP 70/40, rash everywhere, desquamation of skin. Elevated Cr. LFL abnormalities → toxic shock syndrome
  - Alternate presentation?
    - Nasal packing
    - SSTI
  - Bug? Staph aureus or Strep pyogenes
  - Pathophys? Toxin that acts as a superantigen → strong inflammatory response
  - Tx?
    - source control (remove foreign body)
    - 1st: give IVF
    - 2nd: add vasopressors (e.g. norepi)
    - Give abx: vanc + clinda
      - Vancomycin or linezolid (covers MRSA)
      - Clindamycin (Inhibits toxic production)
      - If you suspect GAS → give pip-tazo or meropenem + clinda
    - If not improving? Give IVIG
  - Dx? Blood cx

SEPSIS

- SIRS criteria (need 2/4)
  - T < 36 or >38
  - RR > 20
  - HR > 90
  - WBC < 4k or > 12k
- SIRS + source (e.g. pneumonia, UTI) → sepsis
- Sepsis + sign/sxs organ dysfunction → severe sepsis
  - Ex: elevated Cr, elevated LFTs, AMS, lactic acidosis
- Pt that's hypotensive despite volume resuscitation → septic shock
- Most likely pulmonary complication? ARDS
- Management?
  - Recognize it early

    - Give IVF (2 L bolus)
        - If not responding to IVF, give norepinephrine through central line
        - If not responding to norepi, give vasopressin
    - Start broad-spectrum abx ASAP
        - Ex: vanc + carbapenem
        - If pulmonary cause, vanc + ceftriaxone + azithromycin + FQ
        - If neutropenic pt, also cover pseudomonas
            - Ceftazidime
            - Cefepime
            - Carbapenem
            - Pip-tazo
        - If pt not improving on vanc + ceftazidime → add antifungal (e.g. caspofungin)
    - Source control
        - Remove infected line
        - I&D abscess

- Pt with cellulitis.
    - Bugs? Staph (including MRSA) + Strep
    - Dx? Clinical!
        - Don't need to swab
    - Tx?
        - To cover MRSA: Clinda or TMP-SMX
        - To cover Strep: cephalexin
    - Admit if: systemic sxs/signs or hypotensive
        - Tx with vancomycin
- Pt with fever + well-demarcated, tense, erythematous rash on face → erysipelas
    - Bug? Strep pyogenes
    - Dx? Clinical
    - Tx?
        - Penicillin/amoxicillin
        - Cephalexin
        - If systemic signs/sxs → admit & give IV cefazolin
- Pt with something that looks like cellulitis. Area is exquisitely tender to palpation. There are areas of skin discoloration. Bullae or crepitus on exam. Temp 100.9, HR 150 → necrotizing fasciitis
    - Imaging? Gas within soft tissue
    - Labs?
        - Elevated creatinine kinase → C. perfringens
        - Elevated Cr
        - CBC abnormalities (e.g. anemia, thrombocytopenia)
    - Tx?
        - Early abx
            - Vanc + carbapenem + clindamycin (inhibit toxin synthesis)
        - Surgical debridement
        - If due to tetanus vaccine, give it
- Pt with fluctuant mass → abscess

    - Tx? I&D, often don't need to give extra abx
- Woman with fluctuant mass on labia → bartholin gland abscess
    - Tx? Drain it + insert Ward catheter
- Pt with painful masses in axillae → hidradenitis suppurativa
    - Pathophys? Inflammation of apocrine sweat glands
    - Tx? surgery
- Pt with painful mass in intergluteal fold → cyst
    - Tx? Surgery
- Pt that is a gardener with subcutaneous nodules following the course of a lymph node chain → sporotrichosis
    - Bug? Sporothrix schenckii
    - Tx? Itraconazole for weeks
- Pt with abrupt-onset fever/chills, HA, myalgias in December → influenza
    - Presentation in a kid? Diarrhea
    - Pt with flu that was improving then got febrile again. Consolidation on CXR → secondary bacterial pneumonia
        - Bug? MRSA
        - Pathophys? Flu causes impaired mucociliary clearance → predisposed to superimposed bacterial infection
    - Tx that is contraindicated in kids? Aspirin due to the risk of Reye syndrome
    - Neurologic complication? GBS
    - Dx?
        - If low-risk pt w/ classic sxs → none needed
        - If high-risk pt (e.g older person, chronic conditions) → rapid antigen test
        - Rapid antigen detection test
            - NOT sensitive
            - Pretty specific
    - Tx? Neuraminidase inhibitor
        - Timeline to initiate? Within 48 hrs of symptom onset
        - If POing → oseltamivir
        - Zanamivir (inhaled)
            - Contraindications? Airway disease (COPD, asthma, CF)
            - Bronchospastic agent
        - If not POing → IV Peramivir
    - Tx of secondary bacterial pneumonia → vancomycin or linezolid (cover MRSA)

- Herpes manifestations
    - Oral herpes
    - Genital herpes
    - Herpetic whitlow (finger)
    - Lesion on other part of skin (often a wrestler or body builder)
    - Herpes keratitis
        - Slit lamp exam shows dendritic lesion w/ fluorescein staining
    - HSV encephalitis
        - Temporal lobe enhancement

        - LP with RBCs + lymphocytic predominance
        - Tx? IV acyclovir

- Fever + vesicular rash, lesions in different stages of healing → chicken pox (primary varicella)
    - Contagious until all lesions have crusted over
    - Contrast with smallpox
        - Lesions in same stage
        - Lesions on extremities
        - Lesions tend to be larger

- Pt with skin tingling/pain then vesicular lesions in a dermatomal distribution → Shingles (varicella reactivation)
    - Tx? Acyclovir within 72 hrs rash
- 24 yo F with new partner presenting with sore throat. Temp 102F. Exam with cervical lymphadenopathy, exudative pharyngitis, splenomegaly.
    - Dx? Monospot
        - If negative, consider CMV
    - Associations
        - Hogdkin's lymphoma
        - Burkitt's lymphoma
            - Starry sky on histology
            - t(8/14)
        - Nasopharyngeal carcinoma
    - Histology? Atypical lymphocyte (Downey cell)
    - Tx?
        - Supportive care
        - Avoid contact sports for 3-4 weeks
            - Avoid splenic rupture
    - Pt with mono has signs/sxs of airway compromise? Give steroids
        - Steroids for airway compromise, brain (AMS), or CBC abnormality

- Pt brings in a child with temp 103F, runny nose, cough, conjunctival injection. Exam shows white spots on buccal mucosa (Koplick spots). Rash that started on the head and spread down the body → measles
    - Management?
        - Contact health department
        - Give Vit A

- Pt with high fevers. Recent travel to Africa. Pt has been bleeding from ears & nose → hemorrhagic fever (e.g. Ebola)
    - Pathophys? Inflammation → increased vascular permeability
    - NBS? Isolation + appropriate PPE
    - Tx? Supportive

- Pt with exposure to rodents now with fever + hypotension + AKI → hantavirus hemorrhagic fever w/ renal syndrome

- 24 yo MSM with 3 weeks of low-grade fevers + sore throat + rash. Temp 101F + generalized lymphadenopathy → HIV
    - Dx? Antigen (p24)/antibody testing
    - Tx? HAART
        - 2 NRTIs + one other drug (e.g. protease inhibitor, integrase inhibitor)
- Opportunistic infections in HIV
    - Esophagitis → candida, CMV, HSV
        - Tx for candida? fluconazole
    - Thrush → candida
        - Tx? Nystatin or fluconazole
    - Pt with low CD4 gets treatment for HIV then starts having fevers + flu-like illness → Immune reconstitution inflammatory syndrome (IRIS)
    - Retinitis → CMV
        - Tx? Ganciclovir
        - If resistant to ganciclovir? foscarnet
    - Pneumonia
        - MC cause? Strep pneumo
    - Profound hypoxia + increased LDH + interstitial infiltrates on CXR → PCP
        - Tx? IV TMP-SMX
            - Alternatives? Pentamidine or primaquine
        - Steroid criteria?
            - PaO2 < 70
            - A-a gradient > 35
    - Seizures + multiple ring-enhancing lesions on imaging → Toxo
        - Dx? Brain CT or MRI
        - Tx? Pyrimethamine-sulfadiazine
    - High fevers + nuchal rigidity + LP with high OP → cryptococcal meningitis
        - Dx? Latex agglutination test
        - Tx? Amphotericin B + flucytosine (then 1 year maintenance with fluconazole)
    - Chronic watery diarrhea + acid-fast oocysts → cryptosporidium
        - Tx? Nitazoxanide
    - Pt with late-stage AIDS (e.g. CD4 40) with diarrhea → MAC or CMV diarrhea
        - Tx for MAC? REC = rifabutin + ethambutol + clarithromycin
    - Rash with brown-purple nodules → Kaposi's sarcoma
    - Shingles in a non-dermatomal distribution
- Prophylaxis in HIV
    - CD4 < 250, lives in southwest US → cocci ppx with itraconazole
    - CD4 < 200 → PCP ppx with TMP-SMX
    - CD4 < 150, lives in midwest → histoplasma ppx with itraconazole
    - CD4 < 100 → toxo ppx with TMP-SMX
    - CD4 < 50 → MAC with azithromycin
- Healthcare worker that gets stuck with needle from HIV-positive pt → start post-exposure ppx within 2 hrs of being stuck
    - PEP = HAART

    - RF that increase risk of transmission
        - High viral load
        - Deep injury
        - Stick goes into blood vessel

- IVDU with 2 weeks fever + new heart murmur → endocarditis
    - MC bug? Staph aureus
        - #2 MC bug = Strep viridans
        - #3 MC bug = Enterococci
    - Bug in pt with new prosthetic valve (< 60 days)? Staph epidermidis
    - Bug in pt s/p GI or GU procedure? Enterococcus
    - Which valve most commonly affected?
        - Tricuspid in IVDUs
        - Bicuspid in other pts
    - Exam findings?
        - Osler's nodes
        - Janeway lesions
        - Splinter hemorrhages
    - Dx?
        - 3 sets of blood cx from 3 sites (before abx)
        - TEE
    - Empiric tx?
        - Vanc + gent +/- rifampin
    - Abx ppx?
        - What abx? amoxicillin
        - What procedures?
            - dental procedures
            - GI/GU procedures in the setting of GI/GU infection
            - Respiratory tract procedures
            - Procedures on infection skin or MSK tissue
        - Who?
            - Hx of endocarditis
            - Prosthetic heart valve
            - Heart transplant with abnormal valve function
            - Unrepeated cyanotic congenital heart defect

- Pt with puncture wound OR animal bite OR unsterile abortion. Pt reports jaw stiffness and weird muscle spasms. On exam, rigid extremities and back in extension → tetanus
    - Pathophys? Tetanus toxin cleaves SNARE proteins → can't release glycine & GABA (inhibitory NTs) → spastic paralysis
    - Mom with poor prenatal care. Unsanitary delivery conditions or poor care of umbilical stump. When baby is a week old, it is having poor feeding and clenched fists → neonatal tetanus
    - Tx?
        - Admit pt
        - Quiet room (environmental stimuli can cause muscle spasms)

        - Tetanus immune globulin
        - Tetanus toxoid vaccine (different arm)
        - Debride necrotic tissue
        - Benzos to reduce muscle spasms
        - If autonomic hyperactivity, give beta-blocker
        - Often intubate these pts & paralyse muscles (e.g. vecuronium, rocuronium)
- Pt that is bitten by a dog. Weeks later, he starts behaving weird. Hyperactive episodes + hallucinations + hypersalivation + autonomic instability + doesn't want to drink water that progresses to coma → rabies
    - Causes of rabies
        - Bites from dog, bat, shunk, raccoon
    - Very poor prognosis
    - Dx? Postmortem brain pathology
    - Post-exposure prophylaxis?
        - What? rabies immune globulin + rabies vaccine (2 different sites)
        - When is PEP indicated?
            - Any contact with bat
            - Stray animal
            - Animal that can't be observed
        - If it's a domestic animal that can be observed, quarantine it and observe for 10 days

- Pt that is a missionary that just came back from Africa. Has been having fevers every 3-4 days. PE shows splenomegaly. Labs show low Hgb and low platelets → malaria
    - Vector? Anopheles mosquito
    - Dx? Thick & thin blood smear
    - Plasmodium falciparum - worst
        - Complications:
            - Cerebral malaria
            - Jaundice
            - Renal impairment
    - Plasmodium vivax/ovale - hypnozoites can be dormant in the liver
        - Tx? Primaquine
            - Contraindication? G6PD deficiency
    - Plasmodium malariae
    - Tx?
        - Artemether-lumefantrine
        - Atovaquone-proguanil
        - Quinidine + doxy
            - Quinidine adverse effect? QT prolongation

- Pt that is longtime alcoholic presenting with severe LLE cellulitis. He recently swam in a coastal area or consumed shellfish. → Vibrio vulnificus
    - Tx?
        - Doxycycline + cefepime
        - Debridement
- Pt exposed to freshwater with cellulitis → Aeromonas hydrophila

- Pt with folliculitis in the shape of their swimsuit, recently went in hot tub → Pseudomonas
    - Tx? It will usually clear on its own
        - If they need abx, give FQ or aminoglycoside
- Pt that uses hot tubs a lot. Now with respiratory sxs, crackles on exam → hypersensitivity rxn 2/2 thermophilic actinomycete
- Pt that works with water presents with skin lesions. Granulomas on biopsy → mycobacterium marinum

- Watery diarrhea
    - Cruise ship exposure → norovirus
    - Kid → rotovarius
    - Potato salad/picnic food then vomiting with 6 hrs → Staph aureus
    - Profound watery diarrhea → Vibrio cholera
        - Tx? Oral rehydration solution
    - HIV pt → cryptosporidium

- Blood diarrhea
    - EHEC
    - Shigella
    - Campylobacter
    - Salmonella
    - Pseudoappendicitis → Yersinia enterocolitica
    - Also live abscess → Entamoeba histolytica

- Hemolytic uremic syndrome
    - Causes? E. coli O157:H7 or Shigella
    - MAHA (schitoscytes) + thrombocytopenia + elevated Cr

- Diarrhea after recent abx → C. diff
    - Can be watery OR bloody
    - Tx? Oral vancomycin

- Tx of diarrhea
    - Rehydrate
    - Antiemetic (e.g. ondansetron, metoclopramide)
    - If question is making you pick abx? FQ
    - When are abx contraindicated? HUS

- Pt that consumed exotic fish now with flushing, HA, autonomic instability → scombroid poisoning
    - Pathophys? Histamine toxicity
    - Tx? Antihistamine (e.g. diphenhydramine)
    - Contrast with ciguatera poisoning, which will have HAs,myalgias, numbness/tingling of lips/tongue/hands/feet, reversal of hot-cold sensation ("hot things feel cold and vice versa")

- Pt that breeds dogs that has fever that cycles ("undulant fever") → brucellosis
    - Tx? Doxycycline

    -
- Pt with osteomyelitis that was recently bitten by dog → Capnocytophaga canimorsus
    - Tx?
        - Amox-clav
        - clindamycin
    -
- Pt with flu-like sxs or pneumonia (more rarely, endocarditis) that breeds birds → Chlamydia psittaci
    - Tx?
        - Doxy
        - Azithromycin

- Pt that rears cattle/sheep/goats that has been fevers, pneumonia, or endocarditis → Q fever 2/2 Coxiella burnetii
    - Tx? Doxycycline

- Pt with recent tick bite that has fever, HA, myalgias, rash. CBC with anemia & thrombocytopenia. → Ehrlichiosis
    - Vector? Lone star tick
    - Tx? Doxycycline for everyone (including kids + pregnant women)!
    - Can progress to sepsis

- Pt with recent tick bite that has high fevers, HA, rash that started on the palms/soles → Rocky mountain spotted fever 2/2 Rickettsia rickettsii
    - Geographic association? North Carolina
    - Dx? Weil-Felix test
    - Tx? Doxycycline for children and adults
        - Chloramphenicol for pregnant women

- When should kids < 8 yo get doxy?
    - Rocky mountain spotted fever
    - Ehrlichiosis

- Pt that was swimming in Hawaii that now has conjunctival injection + generalized lymphadenopathy + fevers → leptospirosis
    - Visible on dark field microscopy
    - Tx?
        - Penicillin
        - Doxycycline

- Pt with rabbit exposure now with ulcer + swelling of regional lymph nodes → tularemia 2/2 francisella tularensis
    - Alternate presentation?
        - Eye inflammation + preauricular lymphadenopathy → oculoglandular tularemia
    - Possible bioterrorism agent
    - Tx?

        - Doxycycline
        - Aminoglycosides

- Pt with bullseye rash Lyme disease
    - Vector? Ixodes tick
    - Geographic association? Northeastern US
    - Stage 1 = erythema chronic migrans (bullseye rash)
        - Tx?
            - Children age 8+ and adults → doxy
            - Younger than age 8 → amoxicillin
    - Stage 2 = heart block, bilateral Bell's palsy, disseminated rash, arthralgias
        - Tx?
            - Ceftriaxone or cefotaxime (3rd gen cephalosporin)
    - Dx?
        - ELISA (screening)
        - Western blot (confirmatory)

- Pt that works for the FBI/national security OR works in wool-sorting facility that's been having hemoptysis. Widened mediastinum on CXR → pulmonary anthrax
    - Alternate presentation?
        - Macule that becomes an ulcer and then a black eschar → cutaneous anthrax (good prognosis)
    - Pathophys? Spore-forming bacteria
    - Causes?
        - Inhalation of spores from wool
        - Bioterrorism
    - Tx? Cipro + meropenem + linezolid

- Necrotic draining lymph nodes → bubonic plague caused by Yersinia pestis
    - Tx? Aminoglycoside
        - Toxicity? Ototoxicity + nephrotoxicity
        - Other drugs with ototoxicity + nephrotoxicity
            - Vancomycin
            - Cisplatin
                - Prevention? Amifostine
            - Ethacrynic acid (no sulfa loop diuretic)

- Pt with severe bone pain + massive hepatosplenomegaly + high fevers. Recent travel to Southeast Asia → Dengue
    - Vector? Aedes mosquito
    - Labs to follow? CBC
        - They can have hemolysis
        - May require RBC or platelet transfusion
    - Avoid aspirin & NSAIDs because they may have thrombocytopenia

- Dengue-like illness → chikungunya

- Pt with fever + rash + conjunctivitis + joint pain. On exams, often a pregnant woman that delivers NB with microcephaly → Zika
    - Neuro complication? GBS

- Pt with very high fever + severe abdominal pain and distention + bradycardia. A few days after these sxs, a salmon-colored lesion develops on the abdomen → typhoid fever
    - Bug? Salmonella typhi (not salmonella enteritidis!)
    - Tx? FQ
    - If severely ill? Add dexamethasone

- Pt that returns from international travel. Did not get any vaccines prior to travel. Pt had a flu-like illness that progressed to hemoptysis + black emesis + proteinuria → yellow fever
    - Bug? Flavivirus
    - Tx? Supportive care

- Pt that consumed pork that is having seizures → neurocysticercosis
    - Tx?
        - Antiepileptic for seizures
        - Albendazole (+/- praziquantel)
        - Corticosteroids
    - Dx? Calcified lesions on non-contrast head CT
    -
- Pt that immigrated to the US from Africa with painless ulcer somewhere on skin. Starts having fevers that come and go. Family says that pt is very somnolent. Pt becomes comatose and dies. → Sleeping sickness = African trypanosomiasis
    - Vector? Tsetse fly

- Pt with unilateral periorbital edema + painful swelling around bite site → Chagas
    - Vector? Riduvid bug
    - Complications?
        - Dilated cardiomyopathy
        - Achalasia
        - Megacolon (2/2 destruction of enteric nervous system)
    - Tx?
        - Benznidazole
        - Nifurtimox

- Egyptian pt with hematuria → schistosomiasis
    - Vector? Snail
    - Complication? Bladder cancer

- Bloody diarrhea + elevated eos + liver abscess → entamoeba histolytica
    - Tx? Metronidazole

- Pt that traveled abroad and ate lots of street food. Dry cough + severe constipation + elevated eos → Ascaris lumbricoides
    - Pathophys?
        - Worms travel from small intestine up to lungs → pneumonitis (Loeffler's syndrome)
        - Large worm burden → SBO
    - Tx? Albendazole

- Little kid with perianal itching → pinworm (Enterobius vermicularis) infection
    - Dx? Scotch tape test
    - Tx? Albendazole or pyrantel pamoate

- Pt with IDA that works in construction. See a bug burrowing until that pt's skin → hookworm (Ancylostoma duodenale or Necator americanus) infection
    - Bug?
    - Tx? Albendazole

- Nematode that causes myalgias? Trichenella spiralis
    - Pathophys? Cysts in striated muscle
    - Tx? albendazole

- Tapeworms
    - megaloblastic anemia 2/2 B12 deficiency → diphyllobothrium latum
    - Undercooked beef → Taenia saginata
    - Undercooked pork → Taenia solium
    - Tx? Praziquantel

- Pt s/p stem cell transplant comes in with rash + diarrhea → GVHD
    - Tx? Steroids

- Pt s/p recent liver transplant now complaining of severe abdominal pain. Signs/sxs of peritonitis → bile leak
    - NBS? Surgical consult
    - Dx? HIDA scan if not clear

- Infection in recent kidney transplant recipient → BK polyomavirus

- Pt with recent heart transplant presenting with rejection
    - NBS? High-dose methylprednisolone (IV corticosteroid)
    - If bradyarrhythmia → isoproterenol
        - Mechanism? Beta-1 and beta-2 agonist
    - If cardiogenic shock → dobutamine or milrinone

Ep. 184: NBME weird

Most common complications of:

1. cleft lip/palate → Chronic OM/ speech problems
2. BM transplant → GVHD
3. Pregnancy related complication of Anti-phospolipid antibody → recurring spontaneous abortions.
4. first 20 wks of pregnancy → spontaneous abortion
5. terminal disseminated malignancy → Cachexia.
6. AAA → rupture
7. Chronic HTN → LVH
8. first few hours of life in baby of diabetic mom → hypoglycemia
9. meckel's diverticulum → bleeding
10. diverticulosis → diverticulitis.
11. Appendicitis → periappendiceal abscess
12. cholilithiasis → biliary colic
13. Upper UTI → hydronephrosis
14. BPH → obstructive uropathy
15. DM (esp T1) → insulin induced hypoglycemia
16. Infectious complication of chronic granulomatous disease → Pneumonia
17. systemic amyloidosis → renal failure
18. left atrial thrombus → embolization
19. ganglion cyst resection → recurrence.
20. acute pancreatitis within 1-2 weeks → pancreatic pseudocyst.
21. Influenza → primary influenza pneumonia or secondary bacterial superinfection

Abbreviations for the rest of the text:
MC = most common
MCC = most common cause
MCCOD = most common cause of death
MSC = most serious complication
ML = most likely
MLM = most likely mechanism
MLCP = most likely clinical presentation

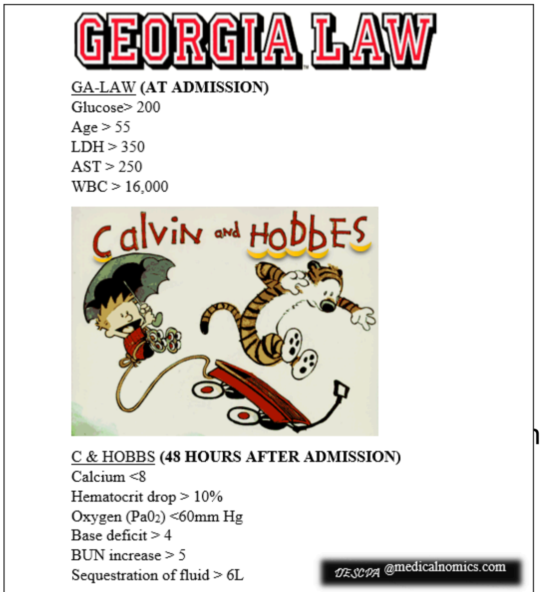
1. MCC of infx in burn pts → P. aeruginosa sepsis
2. Most imp intervention associated w/ decreasing risk of ocular complications in measles pt → Vit A supplementation.
3. MCCOD in hx of chronic HTN → Acute MI
4. MCC of arrhythmia in STEMI → premature ventricular contraction
5. Most serious complication (MSC) + MCCOD of ARF → myocarditis

6. 3 complications of O2 therapy → bronchopulmonary dysplasia, retinopathy of prematurity, IVH (Divine doesn’t consider this a complication but he still mentions it)
7. MCC of esophageal varices → Portal HTN
8. MSC of hirschsprung disease → death due to enterocolitis from super dilated bowel.
9. MSC of UC → toxic megacolon.
10. Most likely outcome of actinic keratosis → resolution of disease
11. most important mechanism underlying hyperglycemia in T1DM → gluconeogenesis
12. MSC of ICP → Brain herniation
13. MCC of cyanide poisoning → house fire
14. MCC of fatty change in liver → chronic alcoholism
15. MCC of skin abscess → S. aureus
16. MCC of death in Ehlers danlos syndrome → aortic dissection
17. Most likely barrier to proper healing of wound → persistent infection
18. most likely cause of rejection in transplant pt → acute rejection
19. most likely malignant complication in pt on chronic immunosuppressant → SCC of skin.
20. MCC of infx overall in transplant recipient → CMV
21. MCC of infx in solid organ transplant (heart, kidney, lung, pancreas) → candida
22. MCC of infx in BMT → aspergillus (put on voriconazole). #2 is candida.
23. Most likely organ to dev complication in pt with lupus → kidney
24. MC cardiac finding in SLE→ fibrinous pericarditis
25. MCC of Drug induced lupus → procainamide
26. MCCOD in SLE → Infx from immunosuppression
27. MC presenting complaint in pt dx w/ scleroderma → raynaud's phenomenon (skin most commonly involved).
28. MCCOD in Systemic sclerosis → respiratory failure
29. MC HIV serotype in the US → HIV-1
30. Most likely mechanism(MLM) of transmission of HIV in US → men having sex with men
31. Most likely cause of HIV in HCW → Needle stick injury
32. Most likely cause of infx in HIV pt CD4 count of 25 → PCP pneumonia or systemic candida infx.
33. MLM behind weight increase in hospitalized pts → increased total body sodium → due to increased blood volume and hydrostatic pressure in blood stream.
34. MLM in Pt with hyponatremia and increased urine osmolality → ectopic ADH production
35. Most likely clinical presentation in pt on HCTZ w/ EKG showing prolonged QT interval + U wave → muscle weakness and fatigue due to hypokalemia
36. MSC of perineal cellulitis → necrotizing fasciitis.
37. MCCOD in ICU → septic shock
38. Boy with a genetic mutation most likely pathogenesis → Enzyme defect
39. mechanism of disease in 25 yo 6ft male, infertile, micropenis → Klienfelters (genetic nondisjunction)
40. MCCOD 1mo – 1 year → SIDS.
41. MCCOD 1 – 44 years → Motor vehicle accidents

42. MCC of blindness in elderly → macular degeneration
43. MC valvular abnormality in elderly → AS
44. No.1 RF for development of pressure ulcers → increased pressure on capillaries
45. MCC of anemia in alcoholic → anemia of chronic disease (be careful not to pick megaloblastic)
46. MCC of thrombocytopenia in healthcare setting → use of heparin
47. MCC of HTN in young reproductive age female → OCP use.
48. MCCOD in pt struck by lightning → cardiorespiratory arrest.
49. ML malignant complication of pt exposed to radiation → acute leukemia. (papillary thyroid only if radiation is to head and neck)
50. Most damaging UV radiation to skin → UVB
51. MSC in low BMI pt → ventricular arrhythmia from hypokalemia
52. MCC of Vit K deficiency in hospitalized pt → use of Abx.
53. Most likely bone to have mets from cancer elsewhere in body → vertebral column
54. No.1 cause of bone mets to vertebrae → Breast Ca. 2. Prostate ca (osteoblastic mets).
55. If there are mets in liver, most likely primary malignancy → lung Ca
56. Brain mets, most likely primary malignancy → lung ca
57. Lung mets, most likely primary malignancy → breast ca.
58. Malignancy that may develop in the future in retinoblastoma pt → osteosarcoma
59. Most common mutation overall that gives rise to malignancy → P53 mut.
60. MC valvular complication in marfan's syndrome → Mitral valve prolapse.
61. Most common neoplastic complication of HIV → Kaposi sarcoma
62. Pt admitted to hospital in US over 65 yrs most likely dx on admission → CHF
63. Most likely initial presentation in RF → migratory polyarthritis.
64. Most common mutation (chromosome) that gives rise to HOCM → Chromosome 11.
65. ML finding on further eval of 55 yo male presenting with Hb of 8, mcv 60 → Polyps/CRC
66. MSC of SCD → acute chest syndrome
67. ML trigger of hemolytic episode in G6PD → acute infection
68. Plt dysfxn most likely presenting clinical complaint → nose bleeds
69. ML infx due to blood transfusion → CMV infection (don't choose HEP C)
70. MC infectious precipitant of an acute COPD exacerbation → H. influenza
71. ML clinical complication of barett-s esophagus → Esophageal ulcers w/ strictures.
72. MCCOD in cirrhosis → rupture of esophageal varices.
73. ML vessel involved in bleeding gastric ulcer→ Left gastric A.
74. Bleeding duodenal ulcer → gastroduodenal A.
75. MCC of cirrhosis in kids → Alpha 1 AT def.
76. no. 1 RF for hepatic adenoma → OCP use.
77. no.1 RF for liver angiosarcoma → Vinyl chloride exposure.
78. no. 1RF for cholangiocarcinoma in US → Primary sclerosing cholangitis
79. No. 1 RF for chronic pancreatitis in a child → cystic fibrosis
80. No. 1 RF for pancreatic adenocarcinoma → smoking

81. No.1 RF for ESRD in US → Diabetes
82. ML renal complication associated with aminoglycoside → ATN
83. ML Renal complication associated w/ SCD → symptomatic hematuria.
84. ML complication of VHL → bilateral RCC.
85. ML site of obstruction in nephrolithiasis → ureter or UVJ.
86. ML cause of sepsis in hospitalized pt → indwelling catheter. MC bug is e coli.
87. MCC of impotence >50 years → vascular insufficiency
88. most likely mechanism behind Endometriosis → reverse menses thru fallopian tubes
89. No.1 RF for female infertility/ectopic pregnancy → PID + scarring from previous PID
90. MC ovarian mass in pregnancy → Corpus luteum cyst
91. MSC of acromegaly → Death from dilated cardiomyopathy.
92. MLCP in pt dx with primary hyperparathyroidism → nephrolithiasis
93. #1 RF for hyperphosphatemia → Chronic renal failure
94. #1 RF for peripheral neuropathy in US → diabetes
95. #1 RF for fasting hypoglycemia in US → Alcoholism
96. MLCP in pt with paget's disease → bone pain
97. MSC of tetanus → pneumonia and cardiac arrest
98. MLCP in pt with MG → ptosis
99. MCC of impetigo → S. Aureus
100. MLCP of superficial dermatophytosis → tinea pedis (ps. If pt has nail fungus or tinea capitis → tx with oral agent, oral terbinafine/itraconazole)
101. MCC of noncommunicating hydrocephalus in neonate → stricture/ obstruction in cerebral aqueduct of sylvius
102. Any pt with CNS infx MLM of disease → hematogenous spread
103. 2 biggest RF for carpal tunnel syndrome → pregnancy and RA.
104. #1 RF for optic neuritis → MS
105. MCC of blindness in HIV → CMV retinitis
106. Favorable prognostic factor in an individual with ALL → presence of t(12;21) translocation.
107. Most important prognostic factor in a pt with Hodgkin's L → clinical stage of disease not type.
108. Ranson's criteria for pancreatitis (criteria for admission to ICU)

- GA LAW:
    - ○ glucose >200 (Divine says 100 but 200 according to Uptodate)
    - ○ AST >250
    - ○ LDH > 350
    - ○ Age >55
    - ○ WBC >16000
- 48 hours post admission → C and HOBBS
    - ○ HypoCalcemia <8 mg/dL
    - ○ Hematocrit dropping by >10%


Calvin and Hobbes

GEORGIA LAW

GA-LAW (AT ADMISSION)
Glucose> 200
Age > 55
LDH > 350
AST > 250
WBC > 16,000

C & HOBBS (48 HOURS AFTER ADMISSION)
Calcium <8
Hematocrit drop > 10%
Oxygen (Pa0₂) <60mm Hg
Base deficit > 4
BUN increase > 5
Sequestration of fluid > 6L

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- ○ O2 sat <60 mmHg
- ○ BUN increase on admission
- ○ Base deficit >4 mg/dL
- ○ Six liters of fluid needed in 48 hr period

109. Most important prognostic factor in pt with RCC → invasion of renal vein
110. Most important prognostic factor in pt with melanoma → depth of invasion
111. Pt with NF2 requires regular hearing screening + annual brain MRIs from ~10 yrs – 4th decade of life.
112. Pt with NF1 → screen for optic nerve gliomas
113. Common complication of sturge-weber syndrome →seizures, developmental delay
114. Most likely primary malignancy in child with multiple bone mets → neuroblastoma
115. ML reproductive complication of receiving systemic chemotherapy → hypogonadism
116. #1 RF for uterine sarcoma → radiation therapy to pelvis
117. MLM behind increased insulin resistance in pregnancy → human placental lactogen
118. A pt about to die, family comes in and you must speak to them → don't ask close ended questions, ask how much they know, how much they want to know. Pick an answer that encourages conversation.
119. Diabetic patients with pyelonephritis not responsive to Abx → obtain a repeat CT to rule out complications of pyelonephritis (i.e perinephric abscess/emphysematous pyelonephritis)
120. In a person with necrotizing fasciitis include clindamycin in the Abx regimen.
121. Diabetic with RUQ may have gangrenous cholecystitis → emergent cholecystectomy
122. Diabetic pt with mucormycosis of sinuses → give Ampho B + debride extensively
123. MC pancreatic neuroendocrine tumor in pt with Hx of MEN1 → gastrinoma
124. ML finding on ECG in pt with cardiac amyloidosis → low voltage.
125. #1 RF for MR → mitral valve prolapse.
126. MCC of folliculitis → S. aureus
127. ML subtype of melanoma in a pt with a dark complexion → acrolentigenous melanoma
128. ML inciting factor in pt with erythema multiforme → recurrent herpes simplex virus infx.
129. ML inciting factor for TEN/SJS → drugs
130. MLM of disease in pt presenting with signs of hypopituitarism → pituitary adenoma
131. In a hospitalized pt with "bones, groans, psychiatric overtones" (hypercalcemia) → malignancy
132. ML symptom that would trigger initial presentation in pt with MEN1 → Sx of hypercalcemia
133. MLCP in MEN2 → medullary thyroid cancer
134. MC infectious cause of odynophagia (painful swallowing) → candida albicans
135. MCC of osmotic diarrhea → lactase deficiency
136. MLM of treatment failure in pt placed on gluten free diet for celiac's disease → non-adherence.
137. ML cause of abnormal LFTs on routine labs → non-alcoholic fatty liver disease.
138. ML cause of knee pain in pt <45 yrs → patellofemoral pain syndrome
139. ML cause of pain at inferior heel → plantar fasciitis
140. Of the 3 main causes of vaginitis, the sexually transmitted one is → Trichomonas.

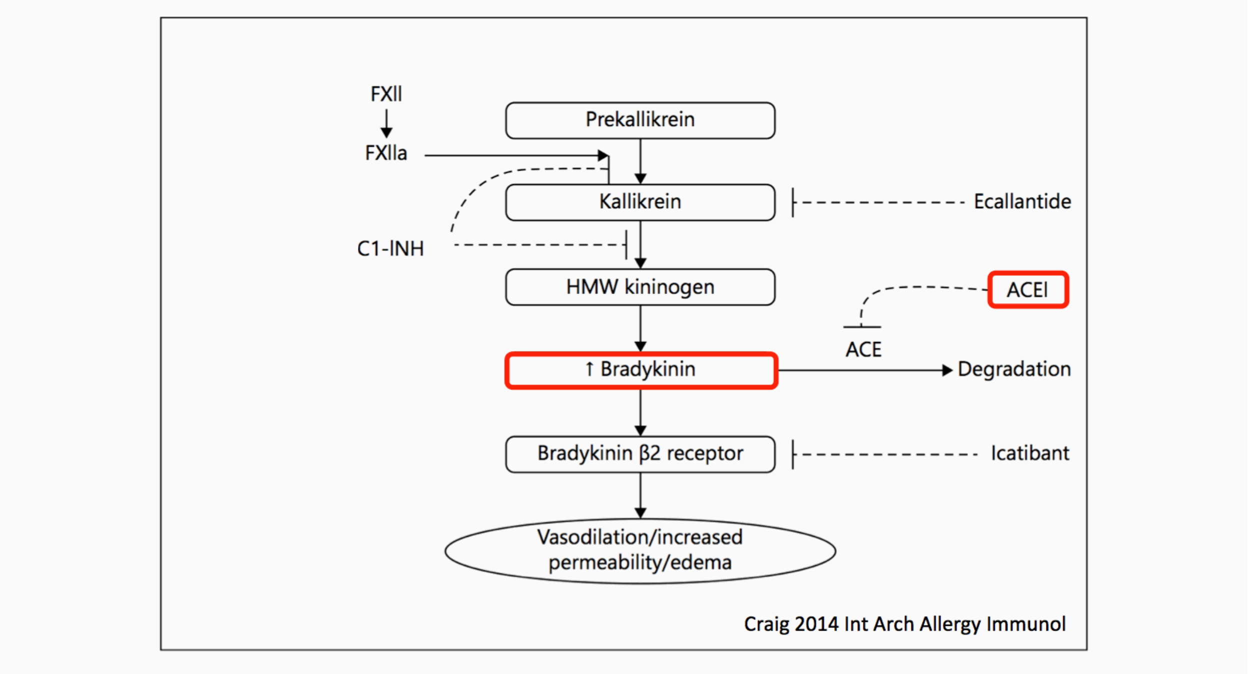
141. MSC in pt receiving blood transfusion in the first 6-12 hours ⟶ Transfusion associated circulatory overload. (^ risk in CKD)
142. MC STI in US ⟶ chlamydia.
143. MLCP of military pt with anthrax ⟶ cutaneous anthrax.
144. Pt from Hawaii with conjunctivitis ⟶ Leptospirosis
145. MCC of pneumothorax in HIV pt ⟶ PCP infx.
146. MCC of DI ⟶ use of lithium
147. MCC of nephrotic syndrome in African Americans ⟶ FSGS.
148. MCC of nephrotic syndrome in Caucasians ⟶ membranous nephropathy
149. MCC in kids ⟶ minimal change disease
150. MSC of extra-renal ADPKD ⟶ rupture of intracranial aneurysm (contradicts episode #37?>I think it means most serious complication where most likely cause of death is CVD)
151. MC malignancy in kidney transplant recipient ⟶ SCC of the skin.
152. MLM of disease in status epilepticus ⟶ low level of antiepileptic drug.
153. #1 RF for intracerebral hmg ⟶ HTN
154. MCC of rapidly progressive dementia ⟶ Creutzfeldt-Jakob Disease
155. ML initial clinical presentation of Cervical Ca ⟶ Abnormal vaginal bleeding.
156. MC anterior mediastinal mass ⟶ thymoma
157. MC middle mediastinal mass ⟶ Lymphadenopathy
158. MC posterior mediastinal mass ⟶ neurogenic tumor/ schwannoma
159. A pt that is nauseous/vomiting ⟶ don’t place on bipap or cpap.
160. MC extra-articular manifestation of ankylosing spondylitis ⟶ anterior uveitis
161. Lupus Ab that has the strongest association with kidney disease ⟶ Anti ds-DNA Ab
162. MLCP of relapsing polychondritis ⟶ red hot painful ear.

CROSS CHECKED? No

Ep. 187: Rapid Review Series 25

- 6 month old w/ CXR showing interstitial infiltrates + BAL with PJP + low IgG, IgE, IgA + high IgM → hyper IgM syndrome
    - Pathophys: problems with class switching (IgM → IgG & IgA)
        - Requires CD40-CD40L interaction
    - PJP in child ddx?
        - SCID
        - DiGeorge
        - Hyper IgM
- Child with recurrent Staph aureus abscesses → chronic granulomatous disease
    - Inheritance? X-linked recessive
    - Pathophys? NADPH oxidase deficiency
    - Cell involved? Neutrophil

    - Dx?
        - dihydrorhodamine (DHR) test
        - nitroblue tetrazolium (NBT) test - older
    - Tx? Interferon-gamma & IVIG
        - Interferon-alpha → hep B and C
            - MDD is a relative contraindication
        - Interferon-beta → MS
        - Interferon-gamma → CGD
        - IVIG → Bruton’s, Hyper IgM, Guillain-Barre
- Newborn w/ hypocalcemic seizures + tetralogy of Fallot → DiGeorge syndrome
    - Pathophys? 3rd and 4rd pharyngeal pouches fail to form → no thymus and no parathyroid glands → viral/fungal infections + hypocalcemia
    - Cell involved? T cells
    - Imaging? No thymic shadow on NB CXR
        - Also seen in SCID
- Child with infections where WBC count is high but no pus + delayed separation of umbilical cord stump → Leukocyte adhesion deficiency
    - Pathophys? Lack CD-18 or beta-2-integrin → neutrophil cannot adhere to endothelial cells
    - Cell involved? Neutrophil
    - Inheritance? AR
    - May also have bleeding problems. Why? Glanzman thrombasthenia-like defect that causes problems with primary hemostasis
- Pt given enalapril, now c/o severe abdominal pain → hereditary angioedema
    - Pathophys? C1 esterase inhibitor deficiency → cannot shut down kallikrein pathway → increased production of bradykinin → vascular permeability → edema of lips, airway, GI tract
        - ACE breaks down bradykinin, so ACE-Is remove this breakdown pathway
    - Dx? C2 & C4 levels low (due to unchecked consumption of complement)
    - Tx?
        - Ecallantide (direct inhibitor of kallikrein)
        - Icatibant (bradykinin receptor antagonist)


FXII
FXIIa
Prekallikrein
Kallikrein
Ecallantide
C1-INH
HMW kininogen
ACEI
ACE
↑ Bradykinin
Degradation
Bradykinin β2 receptor
Icatibant
Vasodilation/increased permeability/edema
Craig 2014 Int Arch Allergy Immunol

- Child was hypotonic at birth + now 15 yo boy that is very obese + almond-shaped eyes → Prader-Willi syndrome
    - Chromosome? 15
    - Genetic mechanism? Imprinting → maternal gene is turned off
        - Maternal uniparental disomy
        - Paternal deletion
- Girl with inappropriate laughter + intellectual disability → Angelman syndrome
    - Chromosome? 15
    - Genetic mechanism? Imprinting → paternal gene is turned off
        - Paternal uniparental disomy
        - Maternal deletion

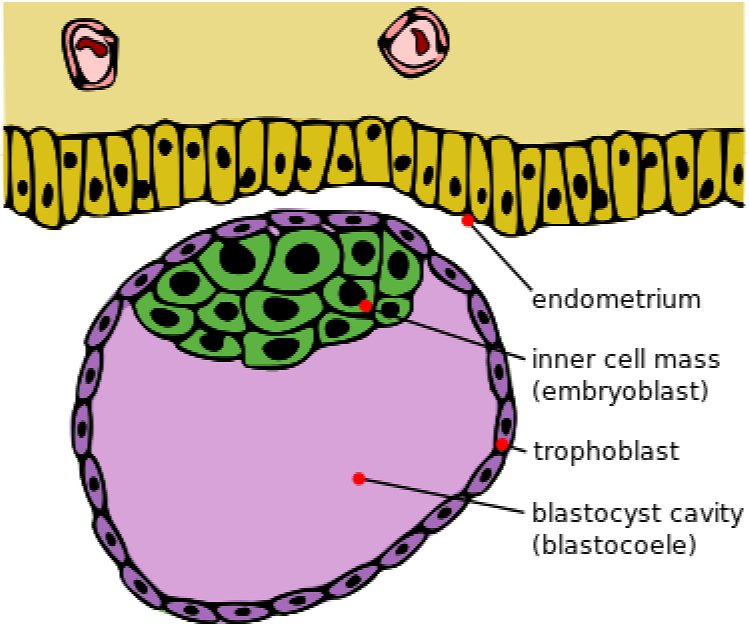
- Drugs that improved survival in HF?
    - ACE-I
    - Spironolactone
        - AE? Gynecomastia (due to androgen receptor antagonism)
    - eplerenone
    - Beta-blockers
        - Metoprolol, carvedilol, bisoprolol
    - Hydralazine / Isosorbide dinitrate (BiDil) **in African-Americans**

- Pt on antipsychotic now with…
    - dilated cardiomyopathy → clozapine
    - hyperprolactinemia → risperidone OR aripiprazole
    - Torsades → ziprasidone (causes QT prolongation)
    - increased Hgb A1c → olanzapine (causes obesity & metabolic syndrome)
    - neutropenic fever → clozapine

    - Visual difficulty + lens opacification on exam → quetiapine (causes cataracts)

- 55 yo M smoked 2 ppd x 40 years, presents with 3 months chronic cough + hard time rising from seated positions → LEMS 2/2 small cell lung cancer
    - Pathophys? Ab to the presynaptic voltage-gated Ca++ channel
    - Dx? EMG/nerve conduction study
        - Incremental pattern with repeated stimulation
    - Other paraneoplastic phenomena of small cell lung cancer?
        - Ectopic ACTH
            - Doesn't suppress with high-dose dex
        - SIADH

- Choriocarcinoma
    - #1 RF? Gestational trophoblastic dz (especially complete mole)
    - Arises from? Trophoblastic tissue
    - Marker? beta-hCG
    - Metastasizes to? Lungs
    - Tx? Methotrexate
    - What if pt with choriocarcinoma now has A-fib, lid lag, hyperreflexia → hyperthyroidism
        - Pathophys? beta-hCG and TSH have similar structures, so beta-hCG can stimulate the TSH receptors and trigger thyrotoxicosis
        - Dx? Elevated T3/T4 + suppressed TSH


endometrium
inner cell mass (embryoblast)
trophoblast
blastocyst cavity (blastocoele)

Ep. 189: Rapid Review Series 26

Focal nodular hyperplasia	Hepatic adenoma
Has central stellate star CentriFugal enhancement (peripheral) on arterial phase Enhanced on HIDA scan (contains biliary epithelium)	Women taking COCs Does NOT have central scar Centripetal enhancement (edges → center) on CT arterial phase Non-enhancing on HIDA scan (don't contain biliary tree)

Sliding hiatal hernia	Paraesophageal hernia	Femoral hernia
GE junction herniates through diaphragm Associated with GERD Tx? Can observe	Fundus of stomach herniates Tx? Surgery! High risk of incarceration → strangulation	Female Under inguinal ligament Medial to femoral vessels Tx? surgery!

Chronic inflammation in any hollow organ can cause strictures. Examples:
GERD → strictures in esophagus → dysphagia
Crohn's → strictures in small bowel → SBO
Recurrent PID → strictures in fallopian tube → infertility
Dx? Hysterosalpingogram

Psoriasis	Acne
Silver scale on extensor surfaces Tx? 1st line: Topical steroids, coal tar, Vit D analog (calcipotriene) 2nd line: add methotrexate or cyclosporine 3rd line: TNF-alpha inhibitors or UV-B phototherapy/PUVA Mental health association? Depression	Tx? 1st line: topical benzoyl peroxide, salicylic acid, or retinoid 2nd line: topical abx (e.g. clinda) 3rd line: oral abx (e.g. doxy) 4th line: isotretinoin (need to be on 2 forms of birth control, check LFTs)

Cardiogenic shock	Septic shock	Hypovolemic
Pathophys: pump doesn't work CO low PCWP increased (>18) BP low SVR high Tx? Inotrope (e.g dobutamine, digoxin, milrinone)	Pathophys:inflammation → systemic vasodilation SVR low CO high (d/t reduced afterload) PCWP low Pulm complication? ARDS Tx? 1st line: abx + fluids 2nd line: norepi	Pathophys: low preload CO low (d/t low preload → low EDV) PCWP low (pump still works) SVR high Tx? 1st line: crystalloid fluids 2nd line: blood transfusion

- #1 RF breast cancer? Age

  - dsDNA break repair problems → BRCA
  - Mismatch repair problems → Lynch
- #1 RF squamous cell carcinoma penis/vulva/anus/cervix? HPV
- #1 RF endometrial cancer? Unopposed estrogen
  - Estrogen + progestin is OKAY!
- #1 RF lung cancer? Smoking
- #1 RF ovarian cancer? Age + family hx
- #1 RF papillary thyroid cancer? Radiation to head/neck (e.g. for lymphoma in childhood)
  - Recall Orphan Annie eye nuclei + Psammoma bodies
- #1 RF Burkitt's lymphoma? EBV
- Translocations to know:
  - t(8, 14) → Burkitt's lymphoma
  - t(9,22) → CML (BCR-ABL protein)
  - t(15,17) → APML
  - t(11,22) → Ewing's sarcoma (EWS-FLI protein)
- #1 RF RCC? Smoking
  - Bilateral RCCs → VHL
- #1 RF bladder cancer? Smoking
- #1 RF pancreatic cancer? Smoking

Growing pains	Osteoid osteoma
Bilateral Pain worse at night Pain worse with physical activity during day	Unilateral Pain at night, relieved with NSAIDs (Pathophys: increase in prostaglandins → pain) Bony prominence on PE or imaging

Cholecystitis	Ascending cholangitis	Choledocholithiasis
Fever + RUQ pain only Obstruction at level of cystic duct, not biliary tree Dx? RUQUS, if needed HIDA Cholecystectomy NOW	Fever + RUQ pain + jaundice (AMS + hypotension) Obstruction of CBD Dx? ERCP Cholecystectomy LATER	Mild RUQ pain + jaundice Obstruction of CBD Dx? 1st RUQUS 2nd ERCP or MRCP

HELLP	Intrahepatic cholestasis	Acute fatty liver of pregnancy
Elevated indirect hyperbili (hemolysis) Schistocytes High AST/ALT Low platelets	Obstructive jaundice Direct (conj) hyperbili Elevated alk phos Normal AST/ALT Itching → excoriations	VERY HIGH AST/ALT Hypoglycemia PT/PTT elevated

Gestational hypertension	Pre-eclampsia	Eclampsia
After 20 weeks BP >140/90	BP >140/90 +proteinuria (>300 mg/24 hrs) Severe features criteria? - AMS - Low platelets (<100k) - BP > 160/110 - Elevated Cr - Hepatic dysfunction Tx? Delivery if >34 wks ga	Pre-eclampsia + seizures Tx? Mg

Drugs for HTN in pregnancy? Hydralazine, alpha-methyldopa, labetalol, nifedipine
“Hypertensive Moms Love Nifedipine”

Ectopic pregnancy	Blighted ovum
Fertilized egg implants OUTSIDE uterus	Fertilized egg but embryo does NOT develop Implants INSIDE uterus +gestational sac w/o embryo inside

- Hyperemesis gravidarum
  - 1st trimester
  - Admit to hospital if dehydrated
  - Tx? IVF + IV B1 (thiamine) + IV B6 + IV antiemetics (e.g. ondansetron)
  - Labs? Ketones in blood/urine

- Cervical incompetence
  - RF? Hx LEEP or cervical conization, connective tissue disorder (e.g. Ehlers-Danlos), DES exposure, hx preterm delivery
  - Presentation? No contractions, but can see bag or fetal parts emerging from cervix
  - Tx? Cerclage
  - Prevention in future pregnancies? Vaginal progestin

- Cervical ectopy/cervical ectropion
  - 2 parts of cervix: endocervix (columnar epithelium) + ectocervix (stratified squamous keratinized epithelium)
  - Columnar epithelium of endocervix more susceptible to infection
  - Ectropion (more common in young females & OCP users) makes them more susceptible to STIs

- Amnioinfusion indications
  - Variable decels → suggest cord compression
    - Can help cushion the cord
  - Severe oligohydramnios
    - Risk of cord compression
  - Decrease risk of meconium aspiration syndrome in post-term fetus
    - “Soft call recommendation”...not part of guidelines, but on NBMEs
    - Inhalation of meconium → meconium aspiration syndrome → persistent pulmonary hypertension
    - Amnioinfusion can help avoid this (think of it as diluting/solubilizing meconium)

- Weird bug: Ureaplasma urealyticum
  - Potential cause of:
    - UTIs in sexually active young female

            - #1 cause = E. coli
            - #2 cause = Staph saprophyticus
            - High urine pH (urease-positive → hydrolysis of urea into ammonia)
        - Chorioamnionitis
            - Increased risk of preterm labor, prolonged intubation/mechanical ventilation in neonate, etc.
        - PID
        - Miscarriages
    - Tx?
        - Doxycycline
        - Azithromycin
        - Doesn't have a cell wall, so can't use a cell wall agent! (e.g. penicillins)

- Chorioamnionitis is NOT an indication for C-section
    - Tx? Induce to deliver baby soon

- Women in immediate perinatal period becomes unresponsive + low platelets + elevated fibrin split products + elevated PT/PTT → amniotic fluid embolism

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Ep. 195: Rapid Review Series 27

- Given 3 RFs, with NNH = 5, NNH = 10, NNH = 20. Which is the most important RF?
    - The one with NNH = 5
    - Low NNH → significant RF
    - Low NNT → very effective drug/intervention

- Pre-op patient, what drug would you give for abx ppx? Cefazolin ("Ancef")
    - Decreases the incidence of surgical site infections
    - Administer 30-60 mins BEFORE incision
    - Covers Staph aureus, Staph epidermidis, Strep, some gram-negatives
    - What if hx of beta-lactam allergy?
        - Clinda
        - Vanc

- Infection after shoulder surgery. Bug?
    - Cutibacterium acnes (formerly Propionibacterium acnes)

ENDOCARDITIS PPX

- Who gets abx ppx for endocarditis?
    - Hx prosthetic heart valve
    - Hx infectious endocarditis
    - Unrepaired cyanotic congenital heart dx
    - COngenital heart defect fixed <6 months ago
    - Valve disorder after heart transplant
    - Any plastic in heart (e.g. ring from annuloplasty)
- What procedures require ppx for endocarditis?
    - Invasive dental procedures

  - Incision in respiratory mucosa
  - Ongoing GI/GU tract infection
  - Involving infected skin/muscle/bone
  - Surgery to place prosthetic valve or stent
- What abx do you give?
  - Oral amoxicillin
  - If penicillin-allergic?
    - Cephalexin
    - Macrolide
    - Clinda

Stress	Urge	Overflow
Incontinence with increased intraabdominal pressure (e.g. sneezing) Pathophys? pelvic floor muscle relaxation/weakness Hx many pregnancies/vaginal deliveries Abnormal Q tip test PVR normal Tx? 1st Kegel exercises 2nd urethral sling	Cannot make it to bathroom on time Pathophys? detrusor muscles are overactive (hypertonic) Assn: MS, post-menopausal women UTI can cause transient urge incontinence PVR normal or low Tx? Anticholinergics ("On The Darn Toilet" = oxybutynin, tolterodine, darifenacin/solifenacin, trospium) Mirabegron (beta-3 receptor agonist)	Losing small amounts of urine throughout the day Pathophys? detrusor muscles don't sense when bladder is full & don't contract well, so the bladder fills until it overflows Assn: MS, DM PVR high Tx? Acutely → catheterization ACh agonist (e.g. bethanechol) AChE inhibitor (e.g. neostigmine)

- Woman in 1st trimester, lots of n/v, prepregnancy 200 lbs, now 185 lbs → hyperemesis gravidarum
  - Pathophys? High beta-hCG
  - Associations?
    - Multiples
    - Molar pregnancy
  - Criteria? Loss of >5% prepregnancy weight
  - Labs? Elevated ketones in blood/urine
  - Tx?
    - Inpatient:
      - IVF
      - IV thiamine/B1
      - IV antiemetic (e.g. ondansetron)
    - Outpatient:
      - Vit B6 + doxylamine
      - Small frequent meals
- Pt from Turkey with painful sores on buccal mucosa mouth & on genitals → Behcet's disease

    - Association? Mediterranean descent
    - HLA? HLA-B51
    - Dx? Pathergy test
        - Needle prick on arm → they will form an ulcer

- Other HLAs to know
    - HLA-B27 → seronegative spondyloarthropathies
    - HLA-B57 → HSR to abacavir

MICROCYTIC ANEMIAS

- Iron deficiency anemia
    - Serum iron? Low
    - Ferritin? Low
    - TIBC? High
    - Transferrin saturation? Low
    - RDW? Increased
- Anemia of chronic disease
    - Pathophys? Chronic inflammatory state → increased hepcidin → sequestration of iron in bone marrow macrophages
    - Serum iron? Low
    - Ferritin? High
    - TIBC? Low
    - Transferrin saturation? Low
    - RDW? Normal
- Lead poisoning
    - Pathophys? Inhibition of ALAD and ferrochelatase → can't synthesize protoporphyrin and can't add iron to protoporphyrin to make heme
        - Like an iron overload state
    - Serum iron? High
    - Ferritin? High
    - TIBC? Low
    - Transferrin saturation? High
    - RDW? Normal
- Other causes:
    - Thalassemia
    - Sideroblastic anemia (can be part of myelodysplastic syndrome)
- Myelodysplastic syndrome
    - Sideroblastic anemia
    - Hyposegmented neutrophils
    - Progression to acute leukemia

- Two things to increase power of study (type II error/beta error = incorrectly accept null hypothesis)
    - Increase study population
    - Increase the effect size

- If you increase sensitivity what happens to PPV/NPV?
    - PPV decreases
    - NPR increases (because false negatives are less likely)

Ep. 196: Rapid Review Series 28

Case control study	Retrospective cohort study
Start at outcome and look back to see if there was exposure Example: Look at people who have lung cancer now and see how many were had a certain exposure in the past *Susceptible to recall bias Data reported as odds ratio Odds ratio that crosses 1 is NOT stat sig	Start at exposure & go forward to outcome Example: Look at people who smoked in 1995 and see how many have lung cancer now

- Pt with sudden-onset severe CP radiating to back → aortic dissection
    - Dx
        - If HDS → CT chest
        - If HDUS → Bedside TEE
    - Stanford type A = involves ascending aorta (may involve descending too)
        - Beta blocker + surgery
    - Stanford type B = only involves descending aorta
        - Medical tx only: beta blocker
    - Complications
        - Acute AR
        - RCA occlusion → inferior MI
            - ST elevations in II, III, aVF
            - Preload dependent! Don't get nitrates!

- Drug A lowers SBP by 3 mmHg and DBP by 1.5 mmHg. Conventional tx lowered SBP by 1.5 mmHg and DBP by 0.75 mmHg. P-value is <0.05. Recommend to pt?
    - NO! It is not clinically significant
    - 50% relative risk reduction but small absolute risk reduction

- Risk of death in drug group is 10%. Risk of death in placebo group is 50%. P-value is 0.1. What error is likely present?
    - Study if probably underpowered (type II error)
- Do NOT apply study results without checking the exclusion criteria!
    - Cannot extrapolate results to population that's different from study population

- Recall that cervical nerve roots arise ABOVE the level of corresponding vertebral bodies
    - Crush injury to C5 vertebral body → will affect C6 nerve root (below C5 vertebral body)
    - In other levels, the nerve roots arise BELOW the level of the corresponding vertebral bodies
- NB without thymic shadow (“sail sign”) on CXR?
    - DiGeorge - failure of 3rd and 4th pharyngeal pouches to form
        - no thymus → T cells cannot mature
        - no parathyroid gland → hypocalcemic seizures & QT prolongation
    - SCID
        - Adenosine deaminase or IL2-R mutation
            - IL-2 is a stimulating factor for T cells
- Bipolar disorder
    - Best chronic therapy? Lithium
        - Takes a couple of weeks to reach full effect
        - Decreases risk of death!
    - What if already on lithium, but sxs not totally under control? Adding atypical antipsychotic
    - NBSM in acute mania? Atypical antipsychotic (e.g. quetiapine, ziprasidone, aripiprazole)
        - Alternative: valproate
        - Start lithium during this admission but it will take time to kick in

- What kinds of masses are found in the posterior mediastinum? neurogenic masses
    - Pheo
    - neuroblastoma
- What kinds of masses are found in the anterior mediastinum? Terrible T’s
    - Thymoma
    - Thyroid mass
    - Teratoma
    - “Terrible” lymphoma
    - Thoracic aorta (dilation/aneurysm)
- What kinds of things are found in the middle mediastinum?
    - Lymphadenopathy
    - Bronchogenic cysts

- What acid-base labs would you expect in person with PE?
    - PaO2 low
    - PaCO2 low (due to hyperventilation)
    - Respiratory alkalosis → pH high
    - Can result in hypocalcemia (H+ are stipped off of albumin in alkalotic state, negatively charged albumin can bind Ca++)

- Intervention to decrease risk of surgical site infections? Give cefazolin 30-60 mins prior to incision
    - Risk factor for surgical site infection?
        - Emergency surgery
        - Obesity
        - DM

- Indications for desmopressin?
    - Central DI (dysfunction of supraoptic nucleus, can't make ADH)
    - Von Willebrand disease
        - Elevated bleeding time
        - Protecting group for factor 8 → elevated PTT
        - Mechanism? Desmopressin increases the release of vWF from the Weibel–Palade bodies of endothelial cells
    - Nocturnal enuresis (must be at least 5 years old to get diagnosis)
        - Use bed alarms FIRST
        - 2nd line: desmopressin
        - 3rd line: imipramine (TCA)--but has antihistamine and anticholinergic effects (lots of side effects & potential toxicity!)
            - Widened QRS → TCA overdose
            - Tx of overdose? Sodium bicarb
    - Hemophilia A (deficiency of factor 8)
        - Mechanism? Increased release of vWF → helps protect factor VIII → will protect what little factor VIII they have

von Willebrand disease	Bernard-Soulier	Glanzmann thrombasthenia
Pathophys? vWF deficiency or dysfunctional vWF Bleeding time elevated Ristocetin cofactor assay abnormal PTT elevated	Pathophys? GpIb deficiency (involved in adhesion step, vWF binds to subendothelial collagen and GpIb binds to wVF) Bleeding time elevated Ristocetin cofactor assay abnormal PTT normal	Pathophys? deficiency in GpIIbIIIa (involved in aggregation) Bleeding time elevated Ristocetin cofactor assay WNL PTT normal

*Ristocetin cofactor assay is abnormal whenever there is dysfunctional adhesion

- Person with stage 4 pancreatic cancer (or other bad malignancy)
    - Avoid aggressive interventions with curative intent
        - E.g. AAA repair
    - Usually can't be organ donor

- Person with longstanding constipation reports blood on poop or blood on toilet paper → anal fissue
    - #1 RF? Constipation
    - Tx?
        - 1st line: stool softeners & sitz bath
        - 2nd line: topical nifedipine and/or topical lidocaine
        - 3rd line: lateral internal sphincterotomy

Ep. 197: Bias in Biostatistics

- Selection bias = the people in the study are a bad representation of the population
  - Can I generalize the results of this study to the rest of the world?
  - Examples:
    - Berkson's bias = using a hospital population from the study (will be sicker than non-hospitalized pts)
    - Attrition bias = differences in loss to follow up among study groups (pts who drop out of study may be different from pts who complete the study)
      - Solution? Intention-to-treat analysis
    - Selecting participants from a particular geographic area
    - Volunteer bias = people who respond to surveys or participate in studies likely have different characteristics than those who don't

- Measurement bias = the way you obtain data distorts information that you get from the study
  - The researcher has bias of his own!
  - Examples:
    - Hawthorne effect = people act differently when they know they're being observed
    - Pygmalion effect = a researcher's cognitive bias causes them to subconsciously influence the participants of an experiment
      - e.g. investigator inadvertently conveys his high expectations to subjects, who then produce the expected result
      - Also called "observer-expectancy bias"
  - Solutions?
    - Blinding

- Lead-time bias = confusing early detection with increased survival
  - Example: Cancer X causes death 10 years after the first mutation. If we detect it at year 5, the person will live for 5 years after diagnosis. If we detect it at year 3, the person will live for 7 years after diagnosis BUT patients will still die 10 years after the first mutation.
    - If we detect it at year 3 and give tx, then the person lives for 17 years, this is true benefit NOT lead-time bias

- Length-time bias = late-look bias = you never come in contact with the worst cases of a given disease
  - People with really severe disease die before screening test. Those who are screened have more indolent disease, so it looks like screening saves lives.
  - Example: Collecting data on people with brain cancer. You notice that patients just have headache and no neuro deficits, still completing ADLs. You don't come into contact with pts with very aggressive disease, like rapidly fatal GBMs.
  - Solution?
    - Stratify by disease severity
- Recall bias
  - Especially relevant to case-control studies

    - Example: Mothers of children with birth defects are likely to remember drugs they took during pregnancy than mother of normal infants
    - Ways to mitigate?
        - Reduce length of time between exposure & recall
        - Corroborate the information the pt gives

- Confounding
    - You want everything to be the same between groups except the intervention, so that any difference will be likely due to the intervention
    - Confounder = anything beside the intervention that accounts for the difference between the control & intervention groups
        - A third factor that is either positively or negatively associated with both the exposure and outcome
    - Example: sunburn is associated with increased ice cream consumption (confounder = summertime sun exposure)
    - Example: BP drug is being compared to placebo. Intervention group BP went down by 20 points, control group BP went down by 5 points. However, there is a much higher % of obesity than in the control group. When you stratify by BMI, there is no difference in BP reduction. → obesity is a confounding factor
    - If stratification eliminates difference → confounder

- Effect modification
    - If stratification doesn't erase effects → effect modification
    - Example: When you stratify by BMI, the difference in BP reduction is still present. Implies that there's something about obesity that makes the drug more effective in that population.
    - Example: The increased risk of cancer in smokers is even higher among those who also drink heavily.

Ep. 198: Clutch Hypertensive Integrations.

- Antihypertensives in pregnancy?
    - Hydralazine
    - Alpha-methyldopa
    - Labetalol
    - Nifedipine
    - "Hypertensive Moms Love Nifedipine"

- What drugs should NOT be given to hypertensive mom?
    - ACE-I/ARB → renal dysfunction in fetus

- HTN & stable angina? Nitrate
    - Mechanism? Venodilators → reduced preload → reduce myocardial O2 demand

- HTN & migraines? Beta-blocker
    - Beta-blocker not great for HTN, but work for migraines

- HTN & systolic HF w/ peripheral edema? Loop diuretic (e.g. furosemide, torsemide, ethacrynic acid)
    - Which doesn't have sulfa groups? ethacrynic acid

- HTN & osteoporosis? Thiazide
    - Loops lose Ca++, thiazides cause more reabsorption of Ca++

- HTN & hx nephrolithiasis? Thiazides
    - Thiazide cause hypercalcemia but hypocalciuria
    - Loop diuretics would increase risk of nephrolithiasis because they cause dumping of Ca++ into the urine

- Antihypertensives that improve survival in HF?
    - Beta-blockers: metoprolol, carvedilol, ER bisoprolol
    - ACE-Is/ARBs
    - Aldosterone receptor antagonists (e.g. spironolactone, eplerenone)
    - BiDil (isosorbide dinitrate + hydralazine) in African American

- HTN + hyperthyroidism → propranolol
    - Mechanism? Inhibits 5'-deiodinase that converts T4 to T3 in periphery

- HTN + BPH → alpha-1 blocker (e.g. prazosin, doxazosin)
    - Mechanism? Cause relaxation of bladder neck muscle
    - What drug if they have BPH but you don't want to drop BP → alpha-1b blocker (e.g. tamsulosin)

- On HTN drug, now with dry cough → on an ACE-I
    - Mechanism? ACE enzyme also helps break down bradykinin. ACE inhibitor → bradykinin levels go up → dry cough
    - Where is the site of action of ACE-I? Lungs (endothelial cells of lung capillaries)
    - NBSM? Switch to ARB
    - Contraindications to ACE-I?
        - Hereditary angioedema
            - Pathophys? Deficiency of C1 esterase inhibitor (which also helps break down bradykinin)
        - Bilateral renal artery stenosis
            - Pathophys? Already have low hydrostatic pressure in afferent arteriole → RAS activation → constrict efferent arteriole → maintain glomerular filtration
            - ACE-I will blunt RAS activation → efferent arteriole dilated → inadequate pressures for filtration
            - Presentation? Person put on lisinopril and their Cr doubles + hyperkalemia

- Pt on thiazide that is hypokalemic. NBS? Add potassium-sparing diuretic
    - Aldosterone antagonists (e.g. spironolactone, eplerenone)

    - ENaC blockers (e.g. amiloride, triamterene)

- HTN 2/2 to Conn’s syndrome (primary hyperaldosteronism) → aldosterone antagonist

- Pt recently started on hypertensive, now with malar rash → drug-induced lupus 2/2 hydralazine
    - Drugs-induced lupus drugs
        - INH
        - Procainamide
            - Indication: WPW
        - Hydralazine
        - Phenytoin
        - Etanercept (TNF-alpha inhibitor)
    - Ab? anti-histone
    - Contraindication to hydralazine? aortic dissection

- HTN + pt with bipolar disorder w/ nephrogenic DI due to lithium toxicity → ENaC blockers (e.g. amiloride, triamterene)

- Pt treated with hypertensive emergency, now with lactic acidosis + AMS → cyanide toxicity 2/2 nitroprusside
    - Pathophys? Nitroprusside contains CN- groups, so long nitroprusside infusion can cause CN- poisoning
    - Tx?
        - Hydroxocobalamin (B12 derivative)
        - Amyl nitrate (causes methemoglobinemia, MetHbg can bind CN-) + sodium thiosulfate (form thiocyanate complex which can be excreted)

- HTN + PTSD w/ nightmares → prazosin

- HTN + vasospastic disease (e.g. Raynauds) → dihydropyridine CCB (e.g. amlodipine, nifedipine)

- Hypertensive urgency/emergency drugs
    - Nitroprusside
    - Labetalol
    - Nicardipine/clevidipine

- HTN drugs contraindicated in CHF exacerbation → any drug that reduces contractility
    - Beta blockers
    - non-dihydropyridine CCB (e.g. verapamil/diltiazem)

- HTN + A-fib drugs
    - beta-blocker (class 2 antiarrhythmic)
    - non-dihydropyridine CCB (class 4 antiarrhythmic)

- HTN drug contraindicated in 2nd degree Mobitz II or 3rd degree heart block → beta-blockers

- HTN drugs contraindicated in WPW → AV-nodal blocking agents
    - E.g. beta-blocker, CCB, or digoxin
    - Pathophys? AV-node blockers will cause more flux through accessory pathway (bundle of Kent)

- Resistant HTN 2/2 pheo → alpha-blocker (phenoxybenzamine) THEN beta-blocker
    - Give beta-blocker first → unopposed alpha → hypertensive crisis

- HTN 2/2 cocaine overdose → do NOT give beta blocker!
    - Tx? Benzos

- Drug for nephrogenic DI → thiazide
    - Exception: lithium toxicity

- HTN drugs contraindicated in gout → thiazides & loop diuretics
    - Mechanism? Interfere with excretion of uric acid in the nephron

- Pt started on HTN drug, now with gynecomastia → spironolactone
    - Mechanism? Also blocks androgen receptors

- HTN w/ DM or renal insufficiency → ACE-I/ARB
    - Mechanism? Dilate efferent arteriole → decrease intraglomerular hypertension → prevents hyperfiltration injury

- On HTN drug, miss a dose and they have crazy high BP → clonidine (alpha-2 agonist)
    - Indications for clonidine
        - Opioid withdrawal (Opioids act on Mu receptors, inhibit release of catecholamines. Clonidine also inhibits catecholamine release)
        - Tourette's
            - 1st alpha-2 agonist (e.g. clonidine, guanfacine)
            - 2nd atypical antipsychotics
            - 3rd typical antipsychotics

Ep. 199: Rapid Review Series 29

- Sick ICU pt on a vent. What is the best nutrition? Enteral nutrition (e.g. NG tube)
    - Benefits
        - GI tract stimulation
        - Avoid vascular line infection
    - TPN given through central line usually
    - Vitamin/mineral deficiency associated with TPN? Selenium deficiency
- Pt with Wilson's disease on chelator (e.g. trientine, penicillamine) now with dysgeusia, alopecia, poor wound healing? zinc deficiency
    - Mechanism? Trientine especially can chelate zinc as well (cross reactivity)

CONTRAINDICATIONS TO BIRTH CONTROL

- Wilson's disease → No Cu IUD
- Heavy menstrual bleeding → No Cu IUD
- Forgets meds → No OCPs
- Postpartum → No estrogen-containing methods (VTEs & reduces milk supply)
- Needs rapid return to fertility → No Depo-Provera
- Hx osteoporosis → No Depo-Provera
- Doesn't want weight gain → No Depo-Provera
- Hx breast cancer → nothing with estrogen or progesterone
    - Only use Cu IUD
- Recent PID/reproductive tract infection → No IUD

- Pt with prosthetic valve, now with endocarditis
    - Early prosthetic valve endocarditis = within 60 days of surgery
        - Staph epidermidis
    - Late prosthetic valve endocarditis = after 60 days
        - Staph aureus
    - >12 months after surgery
        - Consider Strep virans
    - Mechanical valve: need anticoagulation for life, usually with warfarin!

- Newborn with clicky hip or leg length discrepancy → developmental dysplasia of hip
    - Dx?
        - PE maneuvers: Ortolani & Barlow
        - US
    - Tx? Pavlik harness
        - If >6 months old (late detection) → surgical reduction & spica cast

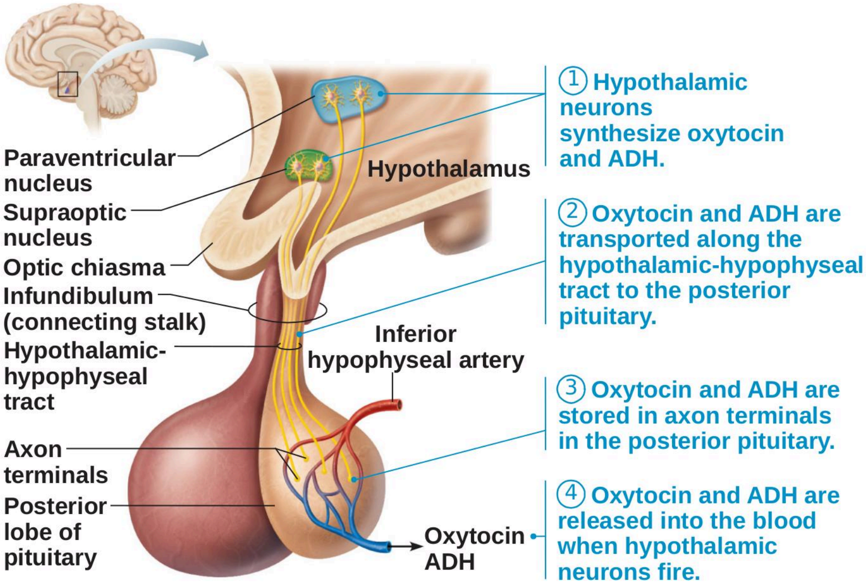
- Pt that uses hards to get up from ground + large calves → Duchene muscular dystrophy
    - Inheritance? X-linked recessive
    - Gene? DMD
    - Mutated protein? Dystrophin
    - Pathophys? Mutation in DMD results in little/no functional dystrophin
    - Usually die before age 30
        - Most common cause of death? Dilated cardiomyopathy
    - Tx?
        - High calorie diet
        - Physical therapy
        - Steroids can help
    - Contrast with Becker's muscular dystrophy
        - Inheritance? X-linked recessive
        - Gene? DMD
        - Pathophys? Mutation in DMD gene results in abnormal dystrophin that retains some function

        - Have some dystrophin
        - Later onset of sxs (age 10-15)
        - Can lives to 50s
    - Similar presentation to Duchene/Becker but in a girl? LGMD (Limb-girdle muscular dystrophy)
        - Inheritance? AD or AR (depending on type)

- Pt from South America now requires multiple pillows at night + pitting edema in LE → consider dilated cardiomyopathy 2/2 Chagas disease
    - Bug? Trypanosoma cruzi
    - Complications?
        - Achalasia → megaesophagus
        - Toxic megacolon
            - Pathophys? Destroys Auberbach's plexus of distal colon
        - Dilated cardiomyopathy
    - Tx? Benznidazole or nifurtimox
- Other causes of toxic megacolon (transverse colon > 6 cm)
    - C. diff
    - UC
    - Scleroderma with bacterial overgrowth

- Pt with hx bipolar disorder, now with tremors & hypernatremia. Why? Lithium toxicity
    - Adverse effects?
        - Nephrogenic diabetes insipidus
            - Li uses ENaC channel to get in and screw up secondary messenger cascade
            - Tx? Amiloride or triamterene
        - Hypothyroidism
        - Teratogen → Ebstein's anomaly ("atrialization of right ventricle")
        - Tremors
        - Seizures - when levels are high
    - If seizures, NBSM? Emergent dialysis

- Pregnant woman on Pitocin, now with hyponatremia. Why?
    - Oxytocin & ADH are very similar in structure. Oxytocin can cross react with V2 receptor → insertion of aquaporin channels in the principal cell of the collecting duct
    - ADH produced where? Supraoptic nucleus of hypothalamus
    - Oxytocin produced where? Paraventricular nucleus of hypothalamus


Paraventricular nucleus
Supraoptic nucleus
Optic chiasma
Infundibulum (connecting stalk)
Hypothalamic-hypophyseal tract
Axon terminals
Posterior lobe of pituitary
Hypothalamus
Inferior hypophyseal artery
Oxytocin
ADH
① Hypothalamic neurons synthesize oxytocin and ADH.
② Oxytocin and ADH are transported along the hypothalamic-hypophyseal tract to the posterior pituitary.
③ Oxytocin and ADH are stored in axon terminals in the posterior pituitary.
④ Oxytocin and ADH are released into the blood when hypothalamic neurons fire.

(a) Relationship between the posterior pituitary and the hypothalamus

- Cortisol has partial activity on mineralocorticoid receptor. Cushing’s syndrome labs can look similar to primary hyperaldosteronism labs
  - Hypokalemia
  - Metabolic alkalosis
- 11-beta hydroxylase deficiency
  - 11-deoxycorticosterone builds up, it has some mineralocorticoid activity as well → HTN & hypokalemia

- Recent vascular procedure, now with SOB & JVD. No breath sounds on one side → likely tension pneumothorax
  - NBSM? Needle decompression = needle thoracostomy
  - Eventual tx? Chest tube = tube thoracostomy
- Recent vascular procedure, now with SOB, lung exam normal → air embolism
  - NBSM? Turn pt to LLD & put in trendelenburg
    - Traps air bubble in RV apex, preventing bubble from going to pulmonary arteries & causing PE physiology

DOWN SYNDROME

- Two genetic mechanisms underlying Down syndrome
  - Maternal nondisjunction
  - Robertsonian translocation (balanced in parent, unbalanced in child)
- Down syndrome complications
  - Heart: endocardial cushion defect
  - GI: duodenal atresia, Hirshprung’s disease, anular pancreas → SBO
  - Heme: ALL
  - Neuro: early-onset Alzheimer’s
- Quad screen results

    - High beta-hCG & inhibin A
    - Low AFP & estriol
    - HIgh for HCG & Inhibin
- Contrast with Edward’s syndrome (trisomy 18) quad results: everything low or normal
    - Usually low beta-hCG and estriol
    - “HE is low”
- Elevated AFP?
    - Neural tube defect
    - Abdominal wall defect (omphalocele or gastroschisis)

- For which two hernias do we always recommend surgery?
    - Paraesophageal
    - Femoral - will be female on NBME exam

- Person with exotic animal exposure with loss of sensation over tip of nose or tip of fingers → leprosy
    - Tends to affect cold regions of the body
    - Dx? Biopsy of affected skin
    - Tx? Dapsone + rifampicin + clofazimine for 2 years
        - “DRC”
    - Specific animal association? Armadillo

Ep. 202: Rapid Review Series 30

- NB with microcephaly + seizures + facial defects, mom traveled with Brazil while pregnant. Brain imaging with thin cerebral cortex → Zika
    - Mom exposed to virus, virus crosses the placenta
    - Zika infects cells that give rise to neurons
    - Imaging? Thin cerebral cortex + diffuse calcifications
- Congenital infections:
    - CMV
        - periventricular calcifications
        - sensorineural hearing loss
        - blueberry muffin rash
    - Toxoplasmosis
        - Hydrocephalus
        - Chorioretinitis
        - Bran calcifications
    - Syphilis
        - Snuffles
    - HIV
        - Recurrent infections
        - Chronic diarrhea

- Pt with hx of DM, HTN, smoking presents with 1/5 muscle strength in UE and LE, no sensory abnormalities → pure motor stroke
    - Neuroanatomical location? posterior limb of the internal capsule
    - Pathophys? Likely a rupture of a Charcot-Bouchard microaneurysm in the lenticulostriate arteries
    - Contrast to an MCA stroke, which would affect mostly the arm & face (not the LEs)

TRANSFUSION REACTIONS

- Acute hemolytic transfusion rxn
    - Result of a systems error (give Type B blood to Type A patient)
    - Presentation? Flank pain + hematuria/hemoglobinuria
    - Pathophys? Type 2 HSR, pre-formed Ab to other blood groups
    - Dx? Direct Coombs test (Ab bound to RBCs)
- IgA deficiency
    - Presentation? Stridor + airway compromise
    - Pathophys? Type 1 HSR, anaphylactic rxn to IgA
        - 1st blood transfusion won't cause rxn, but exposure causes pt to produce Ab to IgA. Class switching to IgE occurs via IL-4.
        - 2nd blood transfusion: IgA binds to IgE on mast cells → cross linking → mast cell degranulation
    - Tx? epinephrine
- Febrile non-hemolytic transfusion rxn
    - Presentation: fevers + chills 1-6 hrs after blood transfusion
    - Pathophys? Cytokines from WBCs in donor blood
    - Tx? Tylenol
- Delayed hemolytic transfusion rxn
    - Presentation? Hematuria/other mild sxs a FEW DAYS after transfusion + positive Coombs
    - Pathophys? Previous exposure to minor blood group antigens (e.g. Kidd, Duffy) results in more rapid production of antibodies with second exposure
        - May have very low levels of Ab in plasma at time of cross match
        - Memory B cells produce Ab at time of exposure
- TRALI (transfusion-related acute lung injury)
    - Presentation? Pt s/p large-volume transfusion now with SOB + crackles on exam + CXR with diffuse infiltrates. PCWP normal.
    - Pathophys? Anti-leukocyte Ab in donated blood → inflammatory response (manifests as ARDS in lungs)
- TACO (transfusion-associated circulatory overload)
    - Presentation? Pt s/p large-volume transfusion now with SOB + crackles on exam + CXR with diffuse infiltrates. PCWP elevated.
        - Alternatively: CVP elevated, BNP elevated, new S3
    - Pathophys? Cardiogenic pulmonary edema
- Dilutional thrombocytopenia
    - Presentation? Pt begins to bleed after large-volume blood transfusion
    - Pathophys? Low platelet concentration if lots of volume is given and platelets are not replaced

TRINUCLEOTIDE REPEAT DISEASES

- 42 yo computer science professor starts acting weird, putting things in his mouth, +involuntary movements (chorea). Father died at age 50 under unusual circumstances. → Huntington's disease
    - Inheritance? AD
    - Repeat? CAG
    - Anticipation phenomenon → offspring express sxs at younger age
    - Tx of movement problems? Tetrabenazine
- 23 yo M at annual visit, can't release handshake grip, physician notices that he's bald → myotonic dystrophy
    - Can present as NB as hypotonia
    - Inheritance? AD
    - Repeat? CTG (“cataracts, toupe, gonadal atrophy”)
    - Mutated gene? DMPK
- Child with ataxia, lots of orthopedic problems, scoliosis + high arching feet (pes cavus) → Freidrich's ataxia
    - Inheritance? AR (most others are AD)
    - Repeat? GAA (think of “GAAIT”)
    - Cause of death? Hypertrophic cardiomyopathy
- Boy with intellectual disability and/or autism, long face, big ears, macroorchidism, MVP → Fragile X
    - Inheritance? X-linked dominant
    - Repeat? CGG (“chin giant gonads”)
    - Mutated gene? FMR1 (fragile X mental retardation 1)
    - Pathophys? CGG repeats → methylation of FMR1 gene → silencing
    - Associated neuropsych disorder? Autism

- Other X-linked dominant syndrome on the NBME? Aplort syndrome
    - “Can't see, can't pee, can't hear a bee”

RESCUE AGENTS

- Acetaminophen toxicity → give N-acetylcysteine
    - Pathophys? Causes production of NAPQI, which is a powerful oxidant and causes hepatocellular necrosis. N-acetylcysteine provides sulfhydryl groups to replenish glutathione stores.
- Pt on nitroprusside drip for days, now with AMS → cyanide toxicity → give amyl nitrate (oxidizing agent) + sodium thiosulfate
    - Pathophys? Cyanide impairs complex IV of the electron transport train, impairing oxidative phosphorylation. This causes body to switch to anaerobic metabolism → lactic acidosis
    - Fe2+ does not find cyanide, but Fe3+ does
    - Tx?
        - Induce methemoglobinemia with amyl nitrate, so Fe3+ binds cyanide. Then give sodium thiosulfate to form thiocyanate, which can be renally excreted.
        - Hydroxocobalamin (B12 derivative)
            - cyanide is cyan, and hydroxocobalamin is cobalt (both blue)
- Baby eats some of mom's medicine, now with bloody stools + bloody emesis + lactic acidosis → iron poisoning
    - Dx? Babygram (will show radiopaque pills)
    - Tx? Chelate iron with deferoxamine

- Opioid → naloxone
- Methemoglobinemia → give methylene blue
    - Pathophys? Methemoglobin (Hgb with Fe3+) can't bind O2
    - Associated drugs?
        - Dapsone
        - Nitrates
        - Lidocaine
        - Primaque
- Carbon monoxide poisoning → hyperbaric oxygen
- Lithium → dialyze if seizures, etc.

Ep. 203: Leukemia and Lymphoma

- Leukemia presentation: disproportionately high WBC count OR normal WBC count + low Hgb + low platelets
- Lymphoma presentation: B symptoms (fevers, night sweats) + some type of lymphadenopathy on exam + normal CBC
    - Often in a young person on NBMEs

LEUKEMIA ALGORITHM

- Child → ALL
    - Down syndrome association
    - Rapidly fatal if not treated
- Midlife → AML/CML
    - AML
        - t(15,17)
        - Auer rods → DIC if they get into the bloodstream
        - Tx? ATRA (Vit A derivative)
    - CML
        - t(9,22) = Philadelphia chromosome
        - BCR-ABL fusion protein
        - Tx? Imatinib (tyrosine kinase inhibitor)
- Elderly → CLL
    - Old person with recurrent bacterial infections + high WBC count
    - CLL is immunodeficiency because proliferative B cells don't make functional Ab
    - Histology: smudge cells
- Hairy cell leukemia
    - Histology: lymphocytes with fine white projections
    - Marker? TRAP-positive

LYMPHOMA

- Hodgkin's lymphoma
    - Lymph nodes affected, CBC normal

    - Bimodal distribution: late teens/20s & 50-60s
    - Histology: Reed-Sternberg cell
    - Different types:
        - More lymphocytes → better prognosis (e.g. lymphocyte-rich)
        - Fewer lymphocytes → poor prognosis (e.g. lymphocyte-depleted)
        - MC type is nodular sclerosing
        - Mixed cellularity - high eosinophils & pruritis
    - Marker? CD15+ CD30+
- Burkitt's lymphoma
    - t(8, 14)
    - Histology: Starry sky pattern
    - Mutation: c-myc amplification → proliferation of lymphocytes
    - Presentation:
        - Jaw mass in African child
        - Abdominal mass otherwise
- Follicular lymphoma
    - t(14, 18)

MULTIPLE MYELOMA
- CRAB symptoms
    - C = hypercalcemia
    - R = renal insufficiency
    - A = anemia
    - B = bone pain (lytic lesions on imaging)
- Dx? SPEP + UPEP
- Histology? Rouleaux on blood smear

MYELOPROLIFERATIVE DISORDERS
- CML
- Polycythemia vera
    - Presentation: aquagenic pruritus + facial plethora (red face) + very high Hgb/Hct
    - EPO low (due to negative feedback)
    - Mutation? JAK2
    - Tx?
        - Phlebotomy
        - Hydroxyurea
- Essential thrombocythemia
    - Very high platelet count
    - Thrombosis AND bleeding risk
    - Pathophys? Lots of platelets but they are dysfunctional
    - Mutation? JAK2
- Primary myelofibrosis
    - Pathophys? Fibroblasts obliterate the bone marrow
    - Dry tap on bone marrow biopsy

        - Histology: dacrocytes on peripheral smear

MISC

- Myelodysplastic syndrome
    - Histology:
        - Pelger–Huët anomaly (hyposegmented neutrophils)
        - Ringed sideroblast

Ep. 204: Military Part 1

Classify TBI (traumatic brain injury) by severity using GCS → ≥13 mild TBI, 9-12 moderate, ≤8 severe TBI.
Pathognomonic → diffuse axonal injury
Anterior temporal lobes + orbital frontal cortex most susceptible to damage in TBI.

1. N-Acetyl Cysteine → to TBI pts to prevent complications
2. Tranexamic acid within first 3 hrs to pts of TBI (traumatic brain injury)
3. Hyperventilation is the fastest measure to lower ICP but can only be used for short term
4. Mannitol can be used as well to lower ICP, but is contraindicated in CHF. Hypertonic saline is another option but risks hypernatremia.
5. NEVER give steroids in traumatic brain injury
6. Keep TBI patients normothermic
7. Central diabetes insipidus can occur after TBI
8. Most common cognitive impairment after TBI- memory loss
9. After discharge from hospital for TBI → send pt to rehab
10. Post concussive syndrome → neuropsych symptoms in a post TBI (mild) pt → headache, dizziness, inc sensitivity to light and sound, anxiety, depression
11. Second impact syndrome → a second ep of TBI after a mild TBI → persistently vegetative or die
12. PTSD (post traumatic stress disorder)→ alcohol abuse is very common post PTSD, Rx SSRIs (sertraline, fluoxetine, paroxetine), venlafaxine; pts tend to have distress, autonomic hyperactivity on re experiencing triggers; it usually arises from an interpersonal trauma vs natural disaster (eg. rape vs earthquake)
13. 4 months pharm Rx does NOT apply to ASD (acute stress disorder, where symptoms last <1 month)
14. CBT (cognitive behavioral therapy) of choice for PTSD, OCD, specific phobias→ exposure therapy
15. eye movement therapy ? (asked us to look up on google)
16. Do not give benzodiazepines to PTSD especially in veterans (coz it worsens it)
17. small volume of hippocampus seen in → PTSD
18. exaggerated response to dexamethasone suppression test seen in → PTSD pts
19. PTSD pts → abnormal low cortisol and high catecholamines in urine due to a maladaptive hyperadrenergic response

20. Don't pick debriefing (a meeting to question someone, typically a soldier or spy, about a completed mission or undertaking) as a treatment for PTSD
21. military sexual trauma W >> M→ is the biggest risk factor for PTSD among servicemen/women
22. Poor mental heath in family, behavorial disorders in children, high risk of suicide, divorce etc in families of deployed servicemen/women; better outcomes w/ pre-deployment planning (medical insurance etc.), communication with family while deployed
23. homelessness is very common in veterans
24. MC comorbidity in veteran is substance use disorder (commonly alcohol)
25. Highest risk can be decades after service
26. For PTSD nightmares use prazosin

CROSS CHECKED? YES, yes

Ep. 206: Family Medicine Shelf Review Series 1

Thyroid Disorders

- Able to palpate pt's thyroid nodule on physical exam.
  - NBS? order TSH level
  - Low TSH = hot nodule = low risk of thyroid cancer
    - NBS? RAIU scan
      - Single hot spot = toxic adenoma
      - Multiple hot spots = toxic multinodular goiter
      - Diffusely increased uptake → Grave's disease
  - Normal TSH or high TSH = cold nodule
    - Usually benign (70-75% cases are colloid cysts), but some are malignant
    - NBS? Thyroid US w/ FNA to check for thyroid cancer

- Papillary thyroid carcinoma
  - Histology? Psammoma bodies, Orphan Annie eye nuclei
  - #1 RF? Hx of head/neck radiation
  - Spread? Lymphatic spread
  - Best prognosis
  -
- Follicular thyroid carcinoma
  - Spread? Hematogenous

- Medullary thyroid carcinoma
  - Histology? Amyloid, apple green birefringence on Congo red stain
  - Poor prognosis
  - Paraneoplastic syndrome? **Hypocalcemia** 2/2 **increased calcitonin levels** produced by tumor
    - EKG finding? **prolonged QT interval**

    - **Clinical picture**: Pt with neck mass + multiple relatives diagnoses with thyroid cancer → medullary thyroid carcinoma 2/2 MEN2A or MEN2B syndrome
        - This pt's relatives have medullary thyroid carcinoma

- **Thyroid biopsy** is **full of lymphoid follicles** → Hashimoto's thyroiditis
    - Also known as? Lymphocytic thyroiditis
    - #1 cause of hypothyroidism in United States
        - Sxs: Bradycardia + fatigue + weight gain + hair loss + high cholesterol
        - **Note**: initially causes increased T3/T4 but eventually causes decreased T3/T4
    - Progresses to what cancer? thyroid lymphoma
        - Sxs: pt with hx of Hashimoto thyroiditis has enlarging thyroid mass

- Hypothyroidism sxs = bradycardia + fatigue + weight gain + hair loss + high cholesterol

- Hyperthyroidism sxs = tachycardia + weight loss + heat intolerance + insomnia + irritability

- Pt with hyperthyroid sxs + low TSH + low uptake on RAIU scan → factitious hyperthyroidism (i.e. pt taking exogenous thyroid hormone)
    - Pathophys? Excess exogenous T3/T4 levels suppress endogenous TSH production

- Pt with tender/painful thyroid + low TSH + low uptake on RAUI scan → Subacute/deQuervain's thyroiditis
    - Pathophys? Diffuse inflammatory process at thyroid glands causes release of preformed thyroid hormone into circulation

- How to DDx Subacute Thyroiditis vs. factitious hyperthyroidism (excessive exogenous thyroid intake)?
        - **Subacute/DeQuervain's thyroiditis = high thyroglobulin levels**
        - **Exogenous thyroid hormone = low thyroglobulin levels**
        - Thyroglobulin is the "c-peptide" of the thyroid (i.e. akin to how C-peptide is measured to check for exogenous insulin use)

- **Newborn** with **umbilical hernia** + **macroglossia** → congenital hypothyroidism
    - MC cause? Thyroid dysgenesis

- MEN 1 = "3 P's": **p**ituitary adenoma **+ p**ancreatic endocrine **tumor +** hyper**p**arathyroidism
    - Pituitary adenoma, e.g.:
        - Prolactinoma → gynecomastia (in men), galactorrhea (in women), infertility
        - GH-secreting pituitary adenoma → acromegaly (enlarging head/hands/feet in **adult**)
    - Pancreatic neuroendocrine tumors, e.g.:
        - Insulinoma
        - Glucagonoma → new-onset DM + rash (necrolytic migratory erythema)
        - Gastrinoma → Zollinger-Ellison syndrome → jejunal ulcers
        - VIPoma → WDHA syndrome (watery diarrhea + hypokalemia + achlorhydria)
    - Primary hyperparathyroidism

- MEN2A – “2 P’s”: primary hyper**p**arathyroidism + pheochromocytoma + medullary thyroid carcinoma
    - Primary hyperparathyroidism
    - Pheochromocytoma → episodic HA + HTN
        - Dx? Increased urine metanephrines
            - NBSIM? CT abdomen or MIBG scan
    - Medullary thyroid carcinoma

- MEN2B – “1 P”: **p**heochromocytoma + medullary thyroid carcinoma + mucosal neuroma + marfanoid habitus
    - Pheochromocytoma
    - Medullary thyroid cancer
    - Mucosal neuromas
    - Marafanoid habitus

- 4 indications for statin tx:
    1. LDL ≥ 190
    2. Hx of ASCVD (e.g. MI, CAD, stroke, PAD)
        - ASCVD = atherosclerotic cardiovascular disease
    3. 40^+ y.o. + diabetes mellitus + LDL >70
    4. 40^+ y.o. + ASCVD risk > 7.5%

- Which 2 statins are “high-intensity statins”? Atorvastatin, Rosuvastatin
    - High-intensity statins given in specific dosing and reduce LDL by ≥ 50%
        - Atorvastatin (40 or 80 mg qday)
        - Rosuvastatin (20 or 40 mg qday)

Vitamin & Mineral Deficiencies:

- Vitamin B1 aka thiamine deficiency = Wernicke-Korsakoff syndrome **or** wet beri-beri
    - Wernicke-Korsakoff syndrome
        - Pathophys? Depletion of Vit. B1 → issues with transketolase in TCA cycle and pentose phosphate pathway
            - Transketolase enzyme uses Vit. B1 as cofactor
        - Triad: **confusion + ataxia + ophthalmoplegia** → Wernicke encephalopathy
            - Tx? IV thiamine then glucose
            - Reversible
            - **Note**: “ophthalmoplegia” can be any eye problem, e.g. nystagmus, lateral gaze palsy, etc.
        - Confusion + ataxia + ophthalmoplegia + **amnesia + confabulation** → Korsakoff syndrome
            - Complication of untreated Wernicke encephalopathy
            - Irreversible
        - Populations at risk?
            - Alcoholics
            - Pregnant woman with hyperemesis gravidarum

                - Hypokalemic hypochloremic metabolic alkalosis
                - Pathophys? Vomiting triggers RAS activation → H+ & K+ excretion
            - Neuroanatomical association/pathology? Hemorrhagic infarction of mammillary bodies

    - Wet beri-beri = dilated cardiomyopathy

- Vitamin B2 = riboflavin

- Vitamin B3 aka niacin deficiency
    - Pellagra = diarrhea, dermatitis, dementia, death
        - Dermatitis on hands + around neck (necklace-like rash)
        - Etiologies:
            - Dietary deficiency
            - Carcinoid syndrome
                - Pathophys? Carcinoid tumor produces excess serotonin → shunts tryptophan to serotonin production instead of niacin production
                    - **Note**: tryptophan = precursor for serotonin and niacin
            - Hartnup disease
                - Pathophys? Defect in neutral amino acid transporter in PCT → cannot reabsorb neutral amino acids (tryptophan is a neutral a.a.)

- Vitamin B6 aka pyridoxine deficiency
    - What drug causes Vit B6 deficiency? Isoniazid treatment for Tb
    - **What 3 pathologies result from Vit B6 deficiency? Sideroblastic anemia, seizures, abnormal LFT's**
        - Sideroblastic anemia
            - Pathophys? ALAS enzyme rxn cannot run → heme production halted
                - ALAS = rate-limiting enzyme for heme synthesis and requires Vit B6 as cofactor
        - Seizures
            - Pathophys? GABA deficiency, i.e. lack of inhibitory n.t's → unopposed excitatory n.t. activity
                - Normally: glutamate decarboxylase requires Vit B6 as a cofactor to convert glutamate to GABA
                - Glutamate decarboxylase cannot run In Vit B6 deficiency → GABA deficiency
        - Abnormal LFTs
            - Pathophys? Transaminases unable to function properly (b/c transaminases normally use Vit B6 as cofactor)
            - Results in AST/ALT > 2
                - **Note:** same finding as LFTs seen in alcoholics b/c alcoholics often have Vit. B6 deficiency ☺

- Vitamin Vit B9 aka folate deficiency

    - **What 2 pathologies result from Vit B9 deficiency? Megaloblastic anemia, neural tube defects**
        - Megaloblastic anemia
            - High homocysteine, normal MMA
        - Neural tube defects
            - Folate is in prenatal vitamins to prevent NTD's
    - Populations at risk?
        - Tea & toast diet/malnutrition
        - Alcoholics
        - Pts on anti-seizure drugs, esp. **valproate**

- Vitamin B12 aka cobalamin deficiency
    - **What 2 pathologies result from Vit B12 deficiency? Megaloblastic anemia, subacute combined degeneration**
        - Megaloblastic anemia
            - Labs show? Elevated homocysteine + **elevated methylmalonic acid**
            - In odd-chain fatty acid pathway, methylmalonyl-CoA mutase converts methylmalonyl-CoA to succinyl-CoA by using B12 as a cofactor
                - So, MMA build ups up in Vit. B12 deficiency
        - Subacute combined degeneration of spinal cord
            - Loss of dorsal columns → loss of vibration, proprioception, light touch
            - Loss of corticospinal tract → UMN lesion signs (e.g. hyperreflexia)
    - Populations at risk?
        - Vegans (B12 comes from animal products)

- Dysgeusia + alopecia → zinc deficiency
    - Etiologies?
        - TPN use (total parenteral nutrition)
        - Wilson's disease tx'ed with trientine
            - Trientine chelates copper *and* zinc

- Mucosal bleeds + fatigue/weakness + muscle aches → Vit C deficiency (scurvy)
    - Pathophys? Body unable to do collagen synthesis (specifically, unable to do hydroxylation of proline & lysine)

- Night blindness → Vit A deficiency

- Osteoporosis + secondary hyperparathyroidism → Vit D deficiency
    - Pathophys? Decreased Vit. D causes decreased Ca2+ absorption from intestines → increased PTH levels in response to low serum Ca2+ levels

- Acanthocytosis on blood smear + ataxia → Vit E deficiency
    - Pathophys? Demyelination of spinocerebellar tracts
        - Myelination of spinocerebellar tracts requires Vit E

- Bleeding problems → Vit K deficiency

- Fat malabsorption causes deficiency of fat-soluble vitamins (Vitamins ADEK)
  - Etiologies?
    - Crohn's, esp. if terminal ileum is resected
    - Cystic Fibrosis → pancreatic insufficiency
    - Celiac disease
    - Chronic pancreatitis

Cross checked: Yes

Ep. 207: Geriatrics

1. Check vision, hearing, fall risk, ur. incontinence
2. Polypharmacy- review meds
3. BEERS criteria
4. Look out for Elderly abuse
5. Assess functional ability- assess ADLs
6. Basic and instrumental ADLs (things that you need to live independently vs things that you need to interact w/ society)
7. MMSE to evaluate cognitive functioning (abN <24)
8. Mini-Cog--> tell pt a series of words then draw a clock then recall the words
9. Check TSH, B12, meds, S. Na, BNP if they have cognitive dysfunction
10. MCC of hearing loss in elderly → presbycusis (high freq hearing loss first)
11. Best screening test to determine hearing loss-> take history then whispered voice test then audiometry
12. Access for Presbyopia, macular degeneration, cataracts
13. Rule out depression in the elderly esp in CKD, stroke, CAD pts; older pts have a greater risk of suicide than younger
14. We don't always use SIGECAPS for elderly; instead ask have you felt depressed/sad/low and ask have you lost interest in the past 2 wks?
15. SSRI is D.O.C. do NOT pick TCA (coz of S/E profile)
16. Fall risk assessment→ ask for h/o problems w/ gait or balance, do a get up and go test (normal is 10-11sec, abN is >20 sec)
17. Interventions that dec fall risk-> exercise, physiotherapy, Vit D supplementation
18. Urge incont./ overactive bladder (hypertonic detrusor)-> bladder training is the best Tx, biofeedback, oxybutynin, tolterodine (best avoided in elderly)
19. Elderly women, G6P6 (multiple deliveries)-> Keigel's exercise, sling procedure
20. Overflow incont. (hypotonic detrusor)-> self catheterization, timed voiding
21. Functional incont. (cognitive problems or arthritis where they can't move fast enough)--> need caregiver

22. Living will aka Advanced Directive
23. Health care proxy (DPOA)
24. POLST forms--> a health care provider has to be present when pt is signing this
25. Palliative care < 6 mos prognosis--> initiate Hospice care
26. Elderly pt driving h/o mild dementia or is taking benzo, TCA or h/o vision problems or h/o falls, ambulation issues, degenerative dz who can have trouble moving neck side to side-> report to DMV
27. Pressure ulcer--> old pt, sensory issues, chrn illness, stool or ur incontinence, vascular dz all RF for developing Pressure/ Decubitus Ulcer. To prevent it, reduce pressure points by using air beds, reduce friction, reduce shearing forces; 4 stages: stage 1- erythema on skin, non blanchable; stage 2- lose partial thickness of skin epi and dermis; stage 3- subcut tissue is exposed but no involvement of fascia/bone/musc/tendon; stage 4 – involvement of fascia, muscle, tendon or bone; give them as much nutrition as possible, consider debridement for stage 3 and 4 ulcer, apply occlusive dressings
28. Surrogate decision maker--> use next of kin (spouse then adult children then parents then siblings then other relatives)

Cross checked? NO

Ep. 208: Transfusion Reactions

1. ***Acute Hemolytic***
    - ***a.*** MCC: ABO incompatibility due to ***clerical errors* (HY)***
    - ***b.*** Ex:Type O person gets Type A or B blood
    - ***c.*** *Presentation*: immediately as transfusion is started complains of : ***back/flank pain, hematuria***
    - ***d.*** Diagnostic test: Direct coombs test
    - ***e.*** Type 2 Hypersensitivity reaction: hemolysis due to preformed antibodies
    - ***f.*** Tx: give fluids! (similar to rhabdomylolysis tx)
    - ***g.*** May go into DIC- give platelets, FFP
2. ***Delayed hemolytic***
    - ***a.*** MCC: DUFFY/KEL/KIDD antigen present not due to Abo incompatibility
    - b. Rxn does not occur during transfusion usually days after!
    - c. + direct coombs test
    - d. Much less severe reactionsà
    - e. Type 2 HS rxn but days later
3. ***Allergic transfusion*** (anaphylaxis)
    - a. MCC: cross linking of IgE on the surface of mast cells
    - b. ONSET: Get blood transfusion- blood contains something you have IgE antibodies to
    - c. *Presentation*: airway problems- wheezing, bronchospasm, normal vitals
    - d. Type 1 HS reaction
    - e. Tx: give antihistamine or IM epinephrine if severe
4. ***Febrile nonhemolytic***

  a. Pathophys (2 mechanisms)
    i. Blood elements specifically Platelets stored at room temp contain WBCs that make cytokines and activate.
    ii. Antibodies from the RECIPIENT attack WBCs in DONOR blood and form an antigen-antibody complex(typ 3HS rxn)à release of cytokines
  b. Present: during transfusion develop chills, fevers, mild tachy, no significant hemodynamic instability
  c. ONSET: ***either during the transfusion OR 1-4 hrs after the transfusion.
  d. Tx: fever reducer (cytokine mediated mechanism)

5. ***TRALI: transfusion related acute lung injury (ARDS)***
  a. Pathophys:
    i. Antibodies from DONOR blood attack WBCs in RECIPIENT blood à antigen- antibody complex
    ii. Basically identical to what happens in the kidneys in nephritic/nephrotic syndromes but in the lungs!
  b. Non-cardiogenic pulmonary edema
  c. Presentation: given normal PCWP (<18mmhg)
  d. Tx: pulmonary support – vents, fluids/pressors, CS
    i. * NO DIURETICS
6. ***TACO: Transfusion associated circulatory overload***
  a. RF: bad heart - HF
  b. Pt is given large volume blood transfusion but heart cant handle the fluid so it backs up in the lungs → pulmonary edema
  c. Cardiogenic pulmonary edema- PCWP> 18mmhg
  d. Tx: give diuretics
  e. Exam Presentation to determine how CVP, BNP and PCWP is affected : **everything goes up!
    i. ↑CVP: proxy for right atrial pressure- fluid overload that the heart can’t pump
    ii. ↑PCWP: proxy for Left atrial pressure- fluid overload
    iii. ↑BNP: whenever chambers are distended for extended period of time they release ANP and BNP to shut down renin-angiotensin system
7. ***Transfusion associated Graft vs Host Disease***
  a. Pathophys: Donor T cells attack recipient tissue
  b. Very high mortality
  c. RF: recipient is immunocompromised
  d. Symptoms: hepatosplenomegaly, diarrhea, pancytopenia, rash
  e. Type 4 HS rxn
  f. prevention: irradiate the donor blood to kill the T cells
8. ***Leukoreduction***
  a. Reduce WBCs in donor blood
  b. Effective for febrile nonhemolytic rxn and possibly in allergic rxn

CROSS CHECKED? No

Ep. 209: Family Medicine Shelf Review Series 2

Episode 209 notes were graciously provided by Divine Intervention from an anonymous contributor.

Depression

- "Down, depressed, hopeless, little interest over past two weeks?"
- Sx:
  - Depression
  - Sleep
  - Interest (loss)
  - Guilt
  - Energy (less)
  - Concentration
  - Appetite
  - Psychomotor
  - Suicidality
- + Mania = ***bipolar disorder***
  - Tx: lithium (ae: nephrogenic DI |-- amiloride/triamterene, hypothyroid), SGA
- + varies with seasons = ***seasonal affective disorder***
  - Tx: SSRIs + phototherapy
- + loss of a loved one, bereavement (for multiple days, horrible guilt) = MDD +/- psychosis >>> grief reaction (no tx)
- + assoc 1 week before menses = PMS --> PMDD
  - Dx: symptom diary
- DDx: hypothyroid, stroke, Parkinson's, Cushing's, interferon (HepC), BB
- Tx
  - SSRI if…
    - CHF, CVD: **sertraline**
    - Sexual dysfunction, smoking: **bupropion** (c/I bulimia)
    - Weight loss: **mirtazapine**
    - C/I pregnancy: **paroxetine**
  - 1st episode --> SSRI for 6-9 mos --> 2nd episode --> SSRI for 6x2 = 12 months --> 3rd episode --> tx for life (or if 2nd episode comes w/I 1 year of 1st)
    - ***Serotonin syndrome***: SSRI, MAOi, linezolid, dextromethorphan/cough syrup, tramadol, buspirone --> myoclonus, hyper-reflexic
  - ***ensure no history of mania

Anxiety

- Sx: irritable, disturbances of sleep, worriers
- C/b: psych co-morbidities
- Tx: SSRI, SNRI, **buspirone**, CBT
  - If anxiety attack, flight, etc |-- one-time **benzo**
- + fear of poor performance in social settings = ***social anxiety disorder***
  - Tx: propranolol (c/I asthma), benzo

- **Panic attack** = palpitations, sweating, SOB, losing control
    - Tx: one-time benzo
    - Multiple attacks --> ***panic disorder***
    - Tx: SSRI, CBT
- + somatic symptom which causes distress in life = ***somatic symptom disorder***
    - Tx: same physician
    - DDx: malingering (+ incentive-based), factitious (+primary gain), factitious by proxy (+imposed on another), conversion disorder (+non-localizable neuro)
- + worry about general health, preoccupation with health-related activities = ***illness anxiety disorder***/hypochondriasis

PTSD

- Sx: re-experiencing traumatic events, avoidance of assoc stimulus, hyper-arousal w stimuli
- Dx: screen for comorbid psych, abuse
- Tx: SSRI, CBT, prazosin --| flashbacks
    - NEVER pick benzos as tx for PTSD!

OCD

- Sx: obsession +/- compulsion
    - **Obsession** = intrusive idea, thought --> anxiety
    - **Compulsion** = things that you do to relieve ^^^
- Tx: CBT exposure & response prevention, "OCD" **d**SSRI, **c**lomipramine, **o**lanzapine
- DDx: OCPD (do not recognize as unreasonable)

Eating disorders

- ***Anorexia nervosa***: BMI < 18.5; distorted body image, amenorrhea
    - c/b osteoporosis, arrythmias, refeeding syndrome (mcc: hypophosphatemia)
    - Tx: CBT
- ***Bulimia***: BMI > 18.5; compensatory behaviors (laxative, vomit)
    - Tx: CBT, **fluoxetine**, imipramine
    - DDx: *binge eating disorder* (no compensatory)
- --> hypochloremic hypokalemic metabolic alkalosis

Schizophrenia

- Sx: disorganized speech, illogical thoughts, disorganized behavior, catatonia, flat affect, alogia, avolition
- Tx: SGA (olanzapine, risperidone, aripiprazole, quetiapine)

ADHD

- Sx: @childhood, inattention +/- hyperactivity in 2 settings
- RF: substance abuse, mood disorder
- Tx: stimulant (methamphetamine, methylphenidate), atomoxetine (SNRI)
    - Stimulants c/I CVD

Ep. 210: Rapid Review Series 31

- Pt with a 40-day long menstrual cycle. How long is the follicular phase?
    - Luteal phase is always 14 days, follicular phase is 26 days
    - Dominant follicle makes estrogen → proliferative endometrium
    - LH surge → ovulation
    - Corpus luteum makes progesterone → converts proliferative endometrium to secretory endometrium

    - If egg is fertilized, zygote implants in endometrium and makes beta-hCG and this maintains the corpus luteum
    - If egg is not fertilized, the corpus luteum degrades after 14 days (FIXED #)
    - Progestin withdrawal test: supply progestin and withdraw it, the person should bleed.
        - If they get a period, it means that progestin deficiency was the problem, so corpus luteum did not form so they probably didn't ovulate.
            - Consider PCOS
- Lesion in the MLF vs PPRF
    - MLF = medial longitudinal fasciculus
        - Location? Pons
        - Function? Makes horizontal conjugate gaze work
        - Looking to the R
            - R eye abduct (R lateral rectus → R CN6)
            - L eye adduct (L medial rectus → L CN3)
            - MLF allow for communication between CN6 & CN3
                - CN6 → MLF → CN3
            - If L MLF lesion, R eye abducts but L is stuck
        - Impaired in INO (often MS pt)
        - MLF that is impaired is the same side as the eye that can't adduct
        - Only 1 eye affected
    - MLF vs. CN3 lesion
        - MLF - cannot adduct when doing horizontal conjugate gaze but CAN adduct for accomodation (normal convergence response)
        - CN3 lesion - cannot adduct for horizontal conjugate gaze or accomodation
            - E.g. compression from PCOM aneurysm
    - PPRF
        - Location? Pons
        - Function? Drives CN6 to create horizontal conjugate gaze
        - Looking to the R:
            - Activate the R PPRF → activate R CN6 → activate L MLF → activate L CN6
            - If R PPRF lesion, the L PPRF is acting unopposed → eyes deviate to the L
        - For PPRF lesion, both eyes deviate AWAY from the side of the lesion
        - Both eyes affected
- Pt with Hartnup disease. What is the most likely psych comorbidity? Depression
    - Pathophys? Defect in transporter that helps reabsorb neutral amino acids
    - Can't absorb tryptophan → can't make serotonin or niacin

- Pulmonary contusion
    - Presentation? Pt who was in MVC with bilateral interstitial infiltrates + hypoxia
- Cardiac contusion
    - Presentation? Pt who was in MVC with CP, elevated PCWP, mildly elevated troponins
- Blunt trauma to kidney
    - 1st step? UA (to look for hematuria)
    - If blood in urine → CT abdomen
    - If UA negative → stop there!

- Which is the biggest RF for C. diff? Recent abx/recent hospitalization

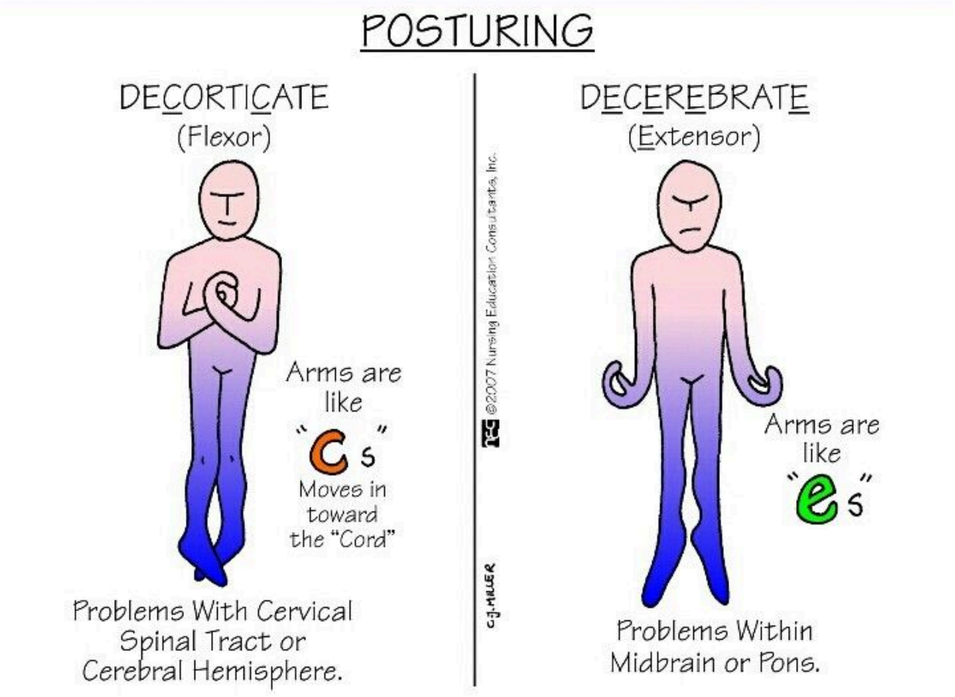
- Elevated alk phos. Causes?
    - Obstructive biliary process
        - Choledocholithiasis
        - Ascending cholangitis
        - Primary biliary cholangitis (destruction of small bile ducts of liver)
    - Bone
        - Paget's disease of bone
    - Check GGT. If GGT elevated too → biliary cause

Ep. 211: Rapid Review Series 32

LOCALIZE THE LESION!

- Pt that has trouble forming new memories (anterograde amnesia) → hippocampus
    - Temporal lobe
- Non-fluent aphasia (can't get the words out, but comprehension is good) → Broca's area (inferior frontal gyrus) of dominant hemisphere
    - L hemisphere in most people
    - Supplied by MCA
- Fluent aphasia (can say the words, but comprehension is terrible) → Wernicke's area of dominant hemisphere
    - Supplied by MCA
- Pt is neglecting one side of the world (e.g. putting make up only on one side of face) → non-dominant parietal lobe lesion
    - In most people: L sided neglect (because R side is non-dominant)
- Agraphia, acalcula, finger agnosia, left-right disorientation → Gerstmann syndrome → dominant parietal lobe lesion
    - Will also tend to have a fluent aphasia (Wernicke's area involved)
- Cortical blindness → primary visual cortex in occipital lobe
    - Contralateral homonymous hemianopia (lose same visual field in both eyes)
    - L visual cortex lesion → lose R visual field in both eyes
- Bitemporal hemianopsia / Heteronymous hemianopsia → optic chiasm compression
    - E.g. due to prolactinoma, craniopharyngioma
- Eyes deviating in one direction
    - Toward side of lesion → frontal eye field
    - Away from side of lesion → PPRF lesion
- Executive dysfunction + disinhibition + contralateral UMN signs (Babinski, pronator drift, hyperreflexia) → frontal lobe
    - Can have reemergence of primitive reflexes

    - Brain tumor in frontal lobe that is calcified w/ fried egg appearance on histology → oligodendroglioma
- Tremors → basal ganglia problem
- Loss of all motor function on one side of body → posterior limb of internal capsule
    - Likely a rupture of a Charcot-Bouchard microaneurysm of lenticulostriate artery (HTN is #1 RF)
- Parkinsonian sxs → substantia nigra
    - Causes of parkinsonism sxs in young person?
        - MPTP contamination of heroin
        - Wilson's disease (movement sxs + psych sxs + liver problems)
            - Copper deposits in basal ganglia
- Person cannot be aroused → reticular activating system (midbrain)
    - Midbrain injury → comatose state
- decorticate posturing → problems above level of red nucleus (in the midbrain)
    - Think problem in CORTEX with deCORTicate
- decerebrate posturing → problems below level of red nucleus (in the midbrain)
- Huntington's disease → atrophy of caudate
- Loss of all motor function, can only wink eyes (locked-in syndrome) → pons
    - Basilar artery stroke
    - Osmotic demyelination syndrome
        - 2/2 rapid correction of hyponatremia
        - "From low to high, the pons will die. From high to low, the brain will blow"
- Vertical diplopia → Parinaud's syndrome → compression of superior colliculus (often due to pinealoma)
- Truncal ataxia → cerebellar vermis lesion
    - Causes? Medulloblastoma, pilocytic astrocytoma
- Limb ataxia → IPSILATERAL cerebellar hemisphere lesion
- Flailing movements of one arm (hemiballismus) → contralateral subthalamic nucleus (part of basal ganglia)
- Obstructive hydrocephalus / non-communicating hydrocephalus. MC Location of the obstruction? Cerebral aqueduct of Sylvius
- Communicating hydrocephalus? Arachnoid granulations (where CSF is reabsorbed)
    - Causes?
        - meningitis
        - malignancy
- Schizophrenia → enlarged lateral ventricles
- Azheimer's → basal nucleus of Meynert
    - Alternatively, CHAT (=choline acetyltransferase) enzyme dysfunction


POSTURING
DECORTICATE
(Flexor)
Arms are like "Cs"
Moves in toward the "Cord"
Problems With Cervical Spinal Tract or Cerebral Hemisphere.
DECEREBRATE
(Extensor)
Arms are like "es"
Problems Within Midbrain or Pons.
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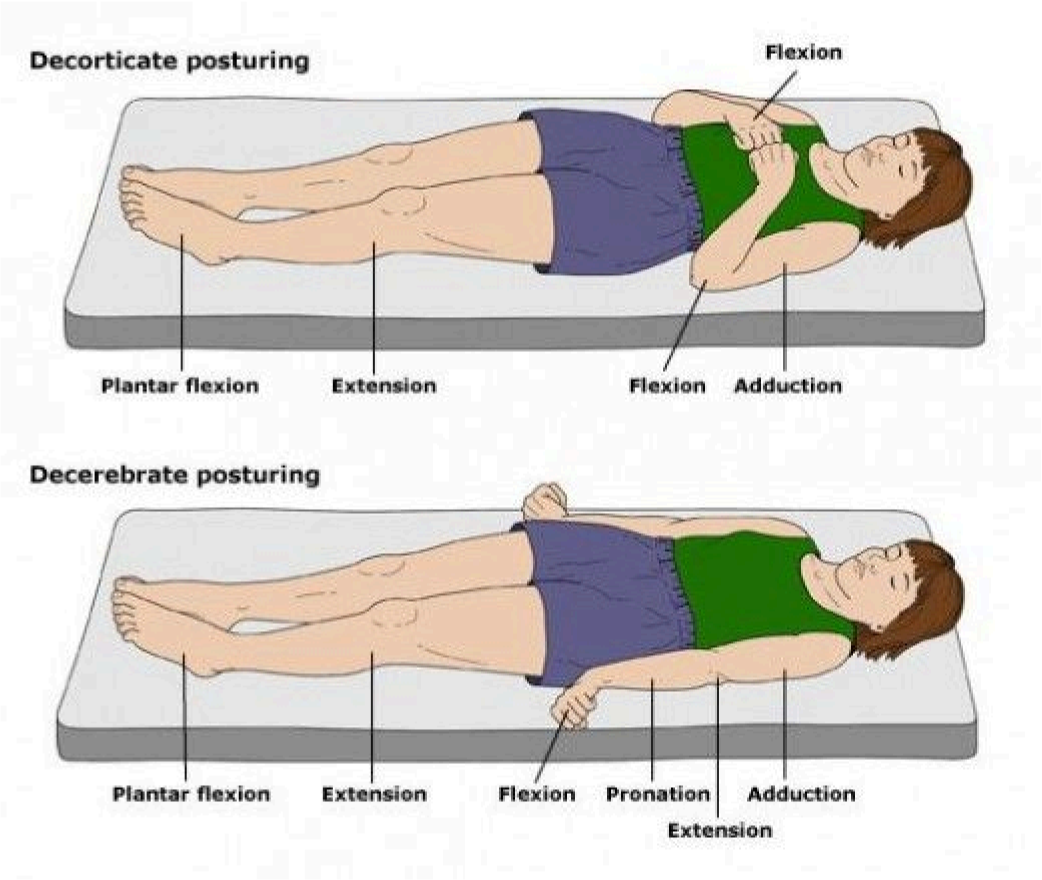
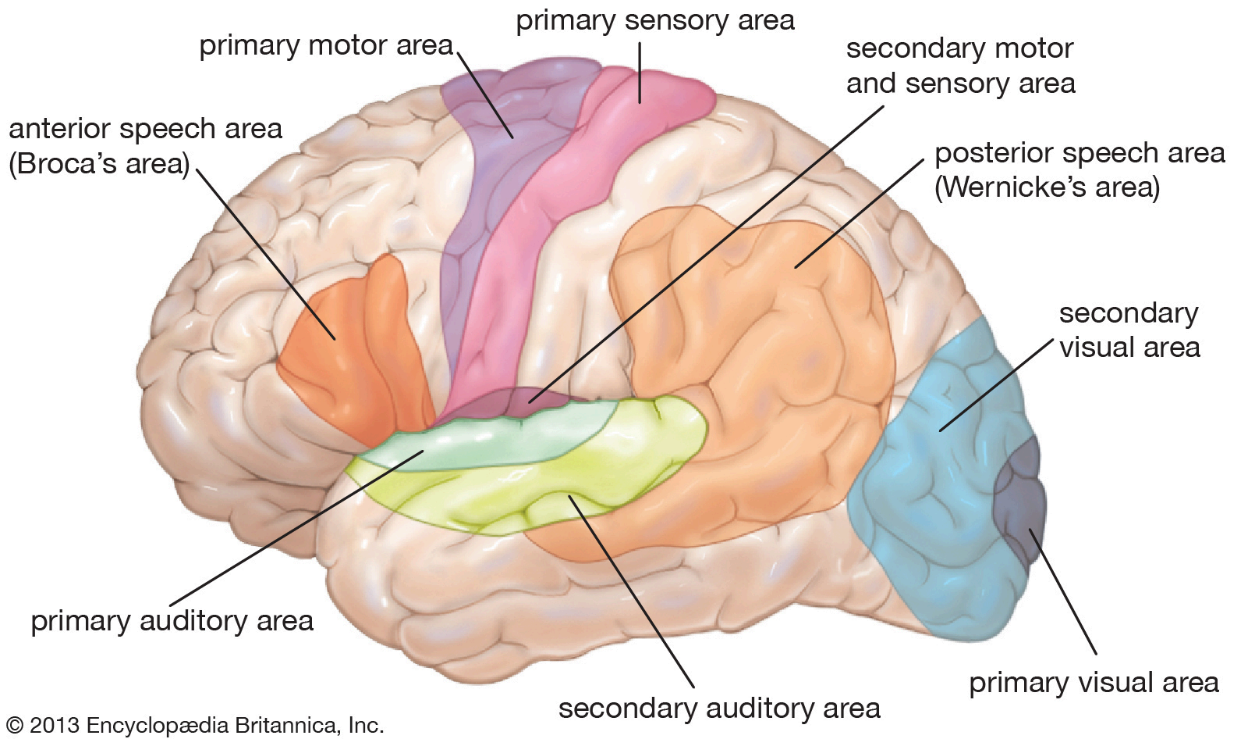
c.j.miller


Decorticate posturing
Flexion
Plantar flexion
Extension
Flexion
Adduction
Decerebrate posturing
Plantar flexion
Extension
Flexion
Pronation
Extension
Adduction


primary motor area
primary sensory area
secondary motor and sensory area
anterior speech area (Broca's area)
posterior speech area (Wernicke's area)
secondary visual area
primary auditory area
primary visual area
secondary auditory area
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Ep. 212: Family Medicine Shelf Review Series 3 (GI)

	Hepatocellular Pattern of Liver Injury	**Cholestatic Pattern of Liver Injury**
Labs	• ↑↑ **AST/ALT** >> AP/GGT **Note**: In hepatocellular pattern, **AST/ALT is disproportionately elevated** compared to ALKP/GGT	• ↑↑**ALKP/GGT** >>AST/ALT • Direct hyperbilirubinemia **Note**: In cholestatic pattern, **ALKP/GGT is disproportionately elevated** compared to AST/ALT
Etiologies	• **APAP toxicity** • **Alcoholic hepatitis** • HAV	• Biliary tree pathology • Hemolytic anemia • Gilbert syndrome
Tx	• **Liver transplant** if MELD score >18 or Marjorie score > 32	• N/A

- Alcoholic + AST:ALT ratio > 2:1 + ↑PTT and ↑PT/INR → Alcoholic Liver Disease
    - Tx? steroids (and liver transplant if needed)
        - Steroids preserve liver function

- Criteria to get liver transplant? MELD score 18+ **or** Marjorie score 32+

- Jaundice + ↑ **ALKP/↑GGT** + **recent illness/surgery/fasting** → Gilbert Syndrome
    - **Indirect** hyperbilirubinemia
    - Benign → supportive tx only

VIRAL HEPATITIS

- **Very** acute-onset + RUQ pain + **jaundice** + ↑ AST/ALT (in 1000's) + **trip to Mexico** = HAV
    - NBSIM? Check Anti-HAV IgM
        - **Remember**: IgM = acute infection
    - Tx? supportive
    - Prevention? HAV vaccine for those with RF's
    - Risk Factors?
        - Travel to endemic area (Mexico)
        - IVDU
        - Cirrhosis
        - Hemophilia
        - MSM
- **HBV**
    - Transmission? blood (needle stick), birthing, bonking
    - HBV Serologies

SUMMARY OF HBV SEROLOGIES

- HBsAg + anti-HBc Ig**M** = acute infection
- **HBeAg** + anti-HBc IgM = window period
- HBsAg + anti-HBc Ig**G** = chronic infection

- Anti-HBs + anti-HBc IgG = resolved infection
- Anti-HBs Ab only = vaccinated

Type of HBV Infection	HBsAg	Anti-HBs Ab	HBeAg	Anti-HBe Ab	Class of HBc Ig
Acute HBV	**+**	**-**	**+**	**-**	**IgM**
Window Period	**-**	**-**	**+**	**- or +**	**IgM**
Chronic HBV (high infectivity/active)	**+**	**-**	**+**	**-**	**IgG**
Chronic HBV (low infectivity/inactive)	**+**	**-**	**-**	**+**	**IgG**
Resolved Infection	**-**	**+**	**-**	**-**	**IgG**
Vaccinated (immunized)	**-**	**+**	**-**	**-**	**-**

- General Rules for HBV Serology
    - +HBsAg = current infection
        - How to DDx acute vs chronic infection? Check whether anti-HBc is IgM vs IgG
            - HBsAg + anti-HBc Ig**M** = acute infection
            - HBsAg + anti-HBc Ig**G** = chronic infection
    - +anti-HBs Ab = vaccinated or recovered
        - How to DDx if vaccinated vs recovered? Check for anti-HBc Ab
            - Anti-HBs Ab + anti-HBc Ab = recovered
                - Anti-core Ab only obtained from actual infection
    - +HBeAg + anti-HBc IgM = window period
- Tx:
    - Needle-stick + unvaccinated → HBV vaccine + IVIG
    - Needle-stick + vaccinated → nothing (no post-exposure PPx needed!)

        - Adults → supportive tx only (most people clear infection)
        - Chronic HBV → **entecavir** (or **tenofovir**) or **pegylated IFN-alpha**
            - Entecavir or tenofovir are c/i in pregnancy
            - Pegylated-IFN-alpha is c/i in MDD, cirrhosis with many complications, cytopenias (e.g. neutropenia, leukopenia, thrombocytopenia, anemia)
        - HIV pt's → **emtricitabine** + tenofovir
    - Prevention? Vaccine at childbirth (3-series)
        - **Note**: babies who contract HBV develop chronic HBV
    - Classic associations in which vignette says "pt has a history of HBV" in order to help you diagnose an associated disease
        - **Polyarteritis Nodosa (PAN)**
            - PAN = chronic abd. pain + asymmetric neuro deficits + ANCA-negative + segmental transmural inflammation on renal angiography + history of HBV
        - **Membranous Nephropathy**
            - Membranous Nephropathy = nephrotic syndrome
- **HCV**
    - Dx? Anti-HCV Ab then HCV RNA (Type 1 in US)
        - Anti-HCV Ab plus positive HCV RNA = active viral replication → so Tx!
        - If pt only has Anti-HCV Ab but no positive HCV RNA, then they once had an HCV infection but cleared it
    - Tx: **sofosbuvir** or **simeprevir**
        - NBSIM before starting anti-HCV drugs? Check for HBV infection before starting anti-HCV drugs
    - RF
        - Born in 1945-1965
        - Blood transfusions
        - IVDU
        - **Mixed cryoglobulinemia** (Raynaud's phenomenon + cold agglutinins)
        - **Porphyria cutanea tarda** (UROD enzyme deficiency)
    - Sequelae:
        - Leukocytoplastic vasculitis (h/o HCV + palpable purpura on feet)

        - **HCC**
            - NBSIM? U/S q 6 months to screen for HCC
        - HBV superinfection

- RUQ pain + ↑ AST/ALT + **ANA+** + **h/o autoimmune disease** → Autoimmune hepatitis
    - RF: other autoimmune disease (e.g. Hashimoto)
    - Dx?
        - Type 1 Autoimmune Hepatitis = **anti-Sm Ab's**
        - Type 2 Autoimmune Hepatitis = **anti-LKM Ab's**
    - Tx? steroids or azathioprine

- ↑ **IgG4** + sausage-shaped pancreas → autoimmune pancreatitis

- **65 yo M** + erectile dysfunction + **skin hyperpigmentation** + new-onset DM + pseudogout + **arthritis in shoulders/elbows/ankles** → hemochromatosis
    - Pathophys? iron deposition in various organs → oxidation of iron causes destruction
    - Dx? Transferrin saturation
    - Tx? Phlebotomy (also the tx for polycythemia and porphyria cutanea tarda)
    - Inheritance? AD
    - Mutations? *HFE* gene (homozygous C282Y mutation; or heterozygous C282Y-H63D mutation)

- **Very obese** + mildly ↑ **AST/ALT** + T2DM or HLD → NAFLD (non-alcoholic fatty liver disease)
    - RF: diabetes; HLD
    - Tx: tx underlying etiology/risk factor (e.g. tx T2DM or HLD)

- PBC and PSC

	Primary Biliary Cirrhosis	**Primary Sclerosing Cholangitis**
Demographic	• **women** 40-60 yo	• **young men** with ulcerative colitis
Location	• Intrahepatic bile ducts	• Intrahepatic + Extrahepatic bile ducts

Labs	● ↑ ALKP + ↑GGT ● (cholestatic pattern) ● **anti-mitochondrial Ab**	● ↑ ALKP + ↑GGT ● (cholestatic pattern)
Diagnostic Imaging	● U/S	● Step #1: U/S o If biliary tree dilated, do MRCP or ERCP ● Step #2: MRCP or ERCP to diagnose and treat! annually o Imaging findings? "string of beads" (areas of dilation and strictures)
Tx	● Ursodiol aka ursodeoxycholic acid ● Replete Vit. ADEK as needed (a/w fat-soluble vitamin deficiency)	● Liver transplant (curative) ● MRCP or ERCP to dilate strictures
Follow-up	● N/A	● U/S q 6 months to screen for HCC ● Colonoscopy at time of PSC diagnosis then **q 1-2y** ● U/S to screen for cholangiocarcinoma

COMPLICATIONS OF CIRRHOSIS

Note: For all cirrhosis patients, get U/S every 6 months to screen for HCC!

Note: Skip to 00:28:35 – this section is based on order starting from 00:29:04

- Hepatosplenomegaly (2/2 portal HTN)
  - Labs? ↓ plt’s

- Excess bleeding (2/2 inability of liver to synthesize clotting factors)

- Cirrhosis + comatose or AMS → hepatic encephalopathy
    - Pathophys? 2/2 NH_4^+ accumulation
    - Triggers of hepatic encephalopathy? Infection, GI bleed
        - What surgery also ↑ risk of hepatic encephalopathy? TIPS procedure
    - Tx? lactulose or rifaximin

- Cirrhosis + SOB + **high A-a gradient** → hepatopulmonary syndrome
    - Dx? echo

- Cirrhosis + SOB + **high RV pressure** → portal-pulmonary hypertension
    - Dx? Echo

- Cirrhosis + ↑ **SCr** → hepatorenal syndrome
    - Pathophys? Cirrhosis causes splanchnic vasodilation → this steals blood away from kidneys → kidneys become hypo-perfused
        - Cirrhosis leads to production of nitric oxide → nitric oxide causes venodilation of splanchnic vessels → ↓SVR → hypoperfusion of kidneys
    - Urine labs are same as what type of AKI? Pre-renal azotemia
        - FENa < 1%
        - BUN/Cr > 20

- Ca^{2+} , PO_4^-, and PTH levels in cirrhosis? ↓Ca^{2+} + ↓ PO_4^- + ↑ PTH
    - Pathophys? Liver unable to synthesize inactive 25-hydroxy-vit-D
    - Tx: calcitriol, bisphosphonate
    - Sequelae: osteopenia, osteoporosis, "secondary hyperpara"

- GI Bleed Management

    - **Note**: Tx is same for all major GI bleeds (whether upper or lower)
    - Tx?
        - **Step #1: 2 large-bores IV's**
        - **Step 2: Fluids (+ blood if Hb < 7)**
        - Step 3: EGD – if you do not find bleed, go to step 4!
        - Step 4: Colonoscopy – if you do not find bleed, go to step 5!
        - Step 5: Tagged RBC scan
        - What meds do you also give in addition to the above steps? IV octreotide + PPIs
    - Summary of Tx for all major GI bleeds? 2 large-bore IV's + fluids + IV octreotide + PPIs + imaging (EGD then colonoscopy then tagged RBC scan)

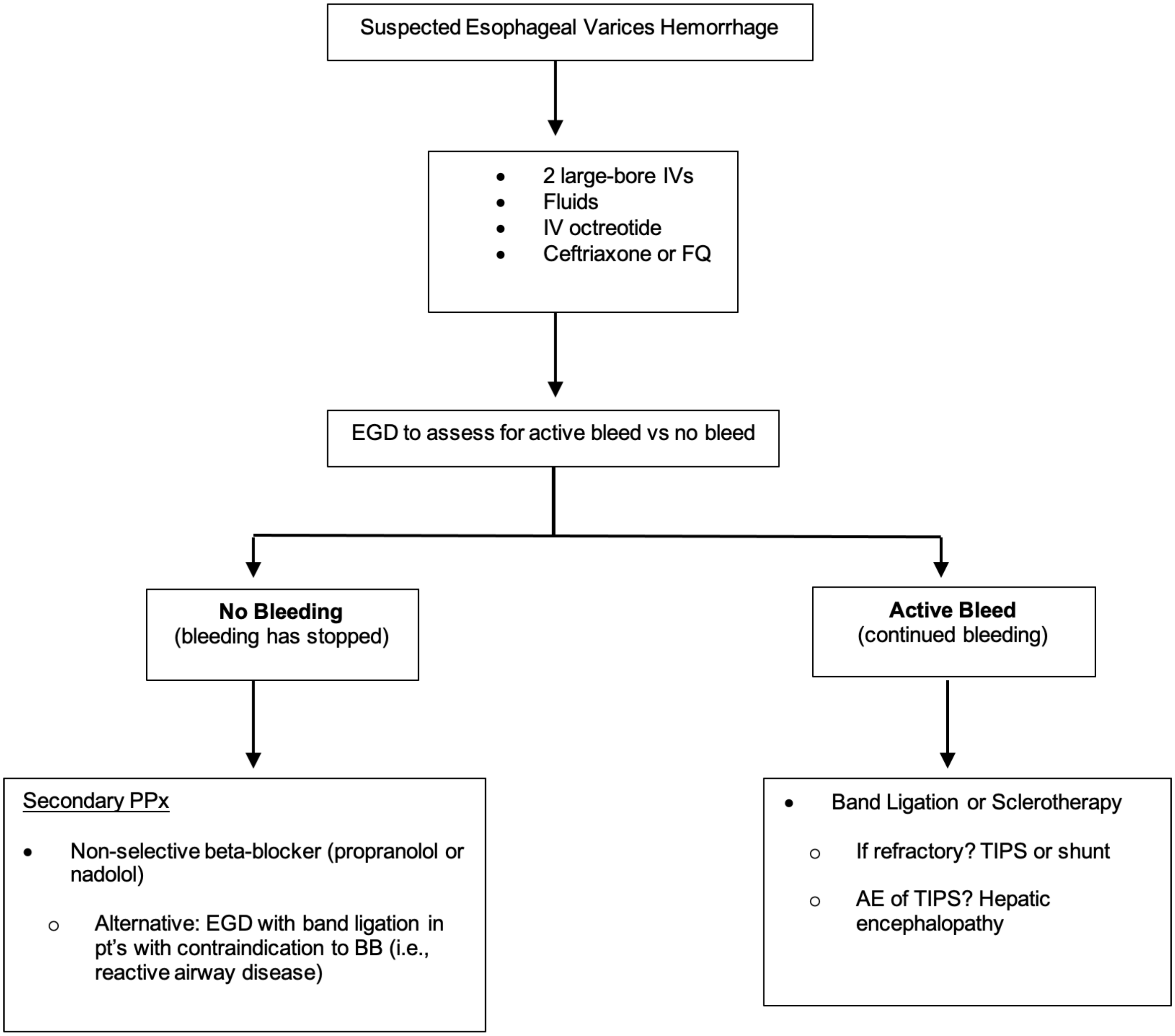
- Cirrhosis + low-grade **fever** + abdominal pain + **ascites** + strange behavior → Spontaneous bacterial peritonitis
    - Dx? Paracentesis with > 250 PMNs
    - Tx: albumin + ceftriazone (or cefotaxime)
        - PPx: FQ (in pt's with ascites but not signs of infection)

- SAAG = [serum albumin] – [ascites fluid albumin] …Therefore, SAAG is only calculated if ascites is present!
    - SAAG < 1.1 indicates absence of portal hypertension
        - Etiologies:
            - **Malignancy**
            - Nephrotic syndrome
            - Pancreatitis (pancreatic ascites)
            - Tb
        - SAAG ≥ 1.1 indicates **portal hypertension is present**
            - Etiologies:
                - **Cirrhosis**
                - Budd-Chiari syndrome
                - Right-sided HF (cardiac ascites)

    - Note: Per UW 2021 QID 4747, these are the correct answers

- HCC → so, monitor with U/S q 6 months

- **Varices**
    - Complication? Variceal Hemorrhage



Suspected Esophageal Varices Hemorrhage
2 large-bore IVs
Fluids
IV octreotide
Ceftriaxone or FQ
EGD to assess for active bleed vs no bleed
No Bleeding
(bleeding has stopped)
Active Bleed
(continued bleeding)
Secondary PPx
Non-selective beta-blocker (propranolol or nadolol)
Alternative: EGD with band ligation in pt's with contraindication to BB (i.e., reactive airway disease)
Band Ligation or Sclerotherapy
If refractory? TIPS or shunt
AE of TIPS? Hepatic encephalopathy

- **Ascites** (2/2 ↓ albumin)

    - Tx: furosemide or serial paracenteses (give albumin if > 5L fluids drawn)

- Very abrupt increase in AST/ALT + comatose or altered mental status + APAP overdose → Acute liver injury
    - Dx? abrupt increase AST/ALT + known insult
    - Etiologies of acute livery injury?
        - **APAP**
        - Acute viral hepatitis
        - *Amanita* mushrooms
        - Systemic hypotension (i.e. "shock liver")
    - Tx?
        - APAP overdose → N-acetylcystein
        - *Amanita* mushroom poisoning → Penicillin G

- ↑ AST/ALT + psych sxs + Parkinsonism + Kayser-Fleisher rings → **Wilson's disease**
        - Parkinsonism = choreiform movements
    - Dx? ↓ serum ceruloplasmin
    - Tx:
        - Penicillamine
        - Trientine
            - AE? Zinc deficiency (chelates both copper and Zinc)

PREGNANCY-RELATED GI PATHOLOGIES

- 1st trimester of pregnancy + severe vomiting + ↑AST/ALT → **Hyperemesis gravidarum**
    - Tx:
        - Inpatient: hydration + anti-emetics + IV thiamine
            - Why thiamine? b/c at risk for Wernicke encephalopathy
        - Outpatient: B6 + doxylamine
    - Sequelae: Wernicke's encephalopathy

- 2nd or 3rd trimester of pregnancy + pruritus + ↑ ↑ ALT + ↑ ↑ AP → Intrahepatic cholestasis

- 3rd trimester of pregnancy + BP > 140/90 mmHg + proteinuria → pre-eclampsia
  - Tx? Deliver baby + IV Mag (seizure PPx)

- 3rd trimester of pregnancy + hemolysis (indirect hyperbilirubinemia) + elevated liver enzymes + low platelets → HELLP syndrome
  - **Note**: hemolysis *always* causes indirect hyperbilirubinemia

- 3rd trimester of pregnancy + rapid-onset + many abnormal liver labs + **coma or encephalopathy** → acute fatty liver of pregnancy
  - Abnormal liver lab include: indirect bili, ↑AST/ALT, ↑PTT, ↑PT/INR

- How to DDx HELLP syndrome vs. acute fatty liver of pregnancy?
  - Acute fatty liver of pregnancy causes coma and encephalopathy
    - HELLP syndrome does not!

OTHER GI PATHOLOGY

- RUQ pain + ↑ **AST/ALT** + fever + **no** jaundice + **U/S shows thickened gallbladder wall with pericholecystic fluid** → Cholecystitis
  - Dx? U/S
  - Tx? cholecystectomy

- Intermittent RUQ pain + no stones on U/S abdomen → biliary sludge

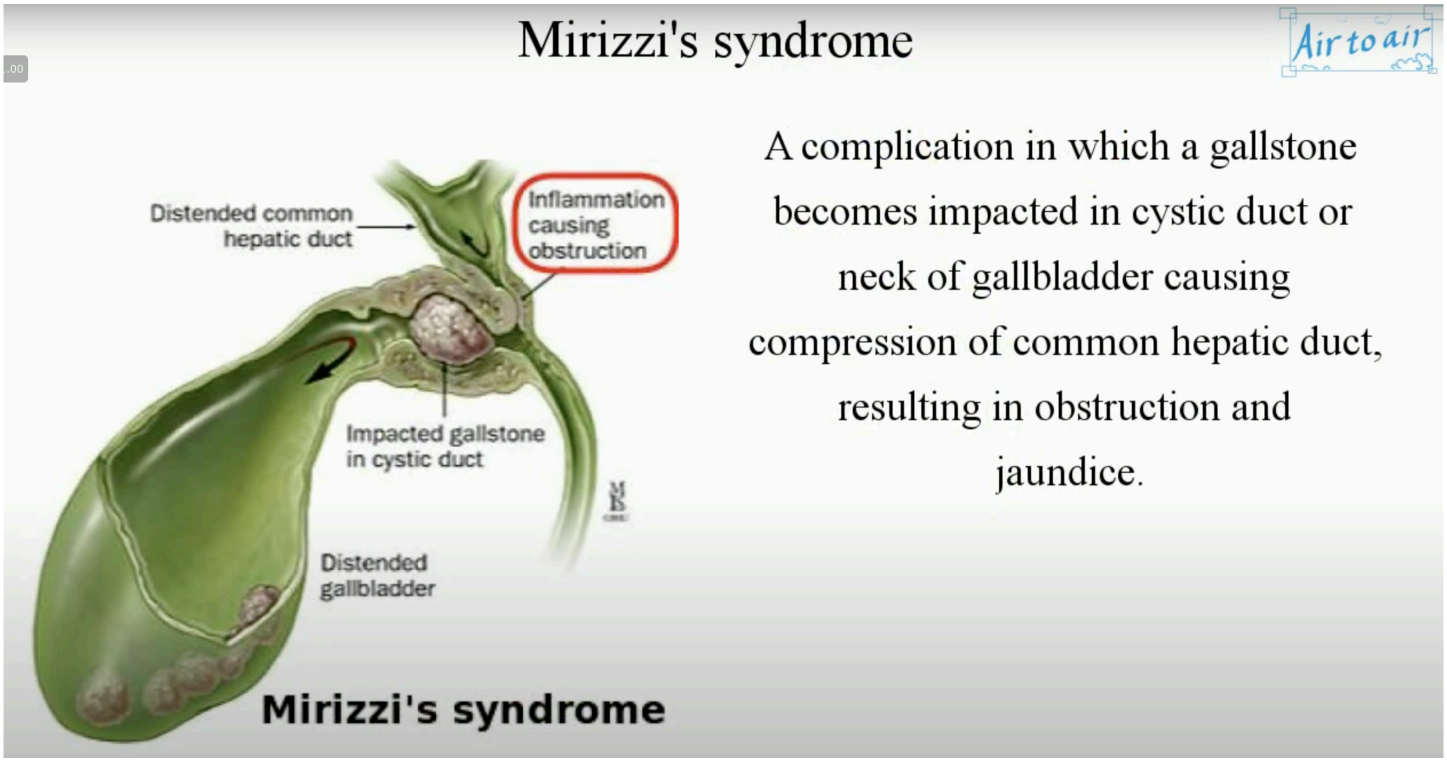
- RUQ pain + jaundice + 104° fever + low BP → **ascending cholangitis**
  - Tx: emergent ERCP + broad-spectrum abx
  - Demographic? ICU patients

- Critically-ill + RUQ pain + fever + **gallbladder wall thickening** and **pericholecystic fluid *without* gallstones** on imaging studies → acalculous cholecystitis

    - Demographics?
        - Elderly
        - TPN nutrition
        - S/p surgery
        - ICU patients
    - Dx? U/S
    - Tx: cholecystostomy
- Epigastric pain that radiates to back + ↑ amylase/lipase (3-4x ULN) → acute pancreatitis
    - Tx? NPO + pain control + IVF
    - RANSOM Criteria

- RUQ pain + purulent vaginal discharge + adnexal tenderness → Peri-hepatitis aka Fitz-Hugh-Curtis syndrome
    - Tx: ceftriaxone + azithromycin (or doxy)

- Jaundice + dilated common hepatic duct + stone in cystic duct → Merizzi syndrome
    - Dx? U/S
    - Imaging finding? Stone in cystic duct plus common hepatic duct dilation
    - **Note**: In contrast, acute cholecystitis = cystic stone but **no jaundice**


Air to air
Distended common hepatic duct
Inflammation causing obstruction
Impacted gallstone in cystic duct
Distended gallbladder
Mirizzi's syndrome

Mirizzi's syndrome

A complication in which a gallstone becomes impacted in cystic duct or neck of gallbladder causing compression of common hepatic duct, resulting in obstruction and jaundice.

- Intermittent vomiting + hyperactive bowel sounds + **dilated** loops of bowel + **pneumobilia** → gallstone ileus aka cholecysto-enteric fistula
    - Pneumobilia = air in biliary tree
    - Gallstone ileus = hepatobiliary cause of small bowel obstruction
  - Pathophys? Gallstone blocks ileum; pneumobilia is d/t air from ileum going into biliary tree

- Elderly + painless large-volume blood on defecation + light-headed + HDUS → diverticulosis
  - Dx? Barium study or CT scan

- 65+ yo + anemia + positive FOBT = colon cancer
  - Dx? Colonoscopy

- Pt w/ AFib + sudden-onset severe abdominal pain → acute mesenteric ischemia
- Pt w/ aortic stenosis + microcytic anemia + bloody stools → **Heyde Syndrome**
  - Pathophys? vWF multimers are cleaved by stenotic aortic valve → prevents 1º hemostasis → results in GI bleed

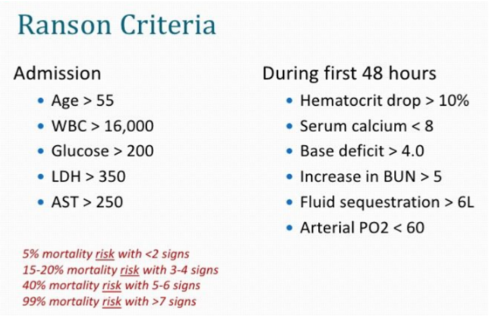
- Pt w/ telangiectasias + recurrent epistaxis + skin discoloration + AV malformations + GI bleeding + hematuria → HHT
  - Telangiectasias commonly on lips

- CROSS CHECKED: Yes

Ep. 213: Family Medicine Shelf Review Series 4 (GI)

ep 213 notes were graciously provided by Divine Intervention from an anonymous contributor.

- Difficulty swallowing, lost weight NBS: **EGD**
  - **Alarm symptoms**: lost weight, dysphagia, odynophagia, max medical therapy w/o improvement, >50Y
- Difficulty initiating swallowing NBS: **video fluoroscopy** ~ barium swallow
  - Dx: *Oropharyngeal* dysphagia (assoc w neuromuscular dz)
- Regurgitation of undigested food, halitosis: ***Zenker's diverticulum***
  - Et: **cricopharyngeal muscle** dysfx
  - Dx: Barium swallow
  - c/I EGD d/t r/o perforation
- Dysphagia to solids and liquids (decreased peristalsis): ***achalasia*** = esophageal motility disorder
  - RF: Chagas disease ("traveled to S America")
  - Dx: **barium swallow** ("birds-beak sign") 2. esophageal manometry 3. EGD (r/o *pseudo-achalasia*!)
    - c/b SCC of esophagus ^^
    - c/I pneumatic dilation --> perforation of esophagus!
  - Tx: CCB, botox, surgical myotomy + PPI
- Heartburn, cough worsened in morning, hoarseness, asthma-like sx: ***GERD***
  - NBS/Tx (if no alarm sx): PPI
    - *GERD + ANY other sx --> EGD
  - Dx: 1. EGD 2. Esophageal pH monitor
  - c/b: *Barrett's esophagus*
    - Tx: endoscopic resection + ablation, PPI
    - F/u: routine EGD q6-12mo
- ***Esophageal adenocarcinoma***
  - RF:
    - 1. Barrett's esophagus
    - 2. GERD
    - *pick the answer most directly related to question at hand!
  - Alcohol, smoking, long-standing GERD in a man --> screening EGD
- Odynophagia, HIV: ***Candidal esophagitis***
  - *may not always present with thrush
  - Tx: **-azole** lozenges, **nystatin** swish 'n swallow
  - MCC esophagitis!
    - Candida
    - CMV
      - TX: **ganciclovir**, foscarnet
    - HSV
      - Tx: **acyclovir**/valacyclovir, foscarnet
- Bisphosphonates, tetracycline, ibuprofen, NSAIDs, potassium, iron tablets: ***pill-induced esophagitis***
  - Tx: drink lots of water/supportive care
- Young pt with dysphagia, GERD: ***eosinophilic esophagitis***
  - Dx: EGD "crap ton of eosinophils"

    - Tx: corticosteroid therapy
- Bloating, burning, gnawing in epigastrium, feel full early (!): ***peptic ulcer disease***
    - Et: **H. pylori**, NSAIDs
        - Dx: **urea breath test**, stool antigen test, (antibody test suboptimal)
        - Tx: "**CAP"** or "**MBTP"**
    - NBS: test for H. pylori
    - C/b: perforation, hemoptysis (esp if ulcer erodes gastroduodenal artery yikes!)
    - + alarm sx! --> EGD
- Chronic **steroid** therapy? Requires bisphosphonates + PPI ppx
    - Et: steroids --> gastric acid production --> ulcers
    - Et: steroids --> avascular necrosis
- Diabetic, early satiety: ***gastroparesis***
    - Other causes: hypothyroidism, scleroderma, chronic opioid therapy, daily diphenhydramine
    - Tx: **erythromycin** (motilin-receptor agonist), **metoclopramide** (dop-antagonist ae: parkinsonism)
        - -LOL this is why macrolides cause diarrhea-
- Weight loss surgery, cramping pain, nauseous, sweating, light-headed: ***dumping syndrome***
    - Tx: smaller meals more frequently, low-carb (prevent hyper-insulinemia)
- Sudden-onset pain in epigastrium going to back: ***pancreatitis***!
    - RF: EtOH, gallstones (4 F's), familial hypertriglyceridemia (>1000), stavudine, didanosine, valproic acid, CF, hypercalcemia, GLP-1 agonist
    - Dx: 2/3 severe abd pain, lipase 3x normal, CT
    - Tx: pain control, IVF
    - F/u: Ranson's criteria (CA HOBBES)
        - 

Ranson Criteria

Admission
- Age > 55
- WBC > 16,000
- Glucose > 200
- LDH > 350
- AST > 250

During first 48 hours
- Hematocrit drop > 10%
- Serum calcium < 8
- Base deficit > 4.0
- Increase in BUN > 5
- Fluid sequestration > 6L
- Arterial PO2 < 60

5% mortality risk with <2 signs
15-20% mortality risk with 3-4 signs
40% mortality risk with 5-6 signs
99% mortality risk with >7 signs

    - C/b: **pancreatic pseudocyst**, chronic pancreatitis (tx: supplementation of fat-soluble vitamins + enzymes), peri-pancreatic abscess
- Hypothyroidism, Graves disease, vitiligo, Addison's///autoimmune "crap" with recurrent epigastric pain: ***autoimmune pancreatitis***
    - Et: IgG4 = pancreatitis, cholecystitis, retroperitoneal fibrosis
    - Dx: CT scan "sausage-shaped pancreas"
    - Tx: corticosteroids

Ep. 214: Family Medicine Shelf Review Series 5 - GI (Version 2)

ep 214 (Version 2) notes were graciously provided by Divine Intervention from an anonymous contributor.

Diarrhea

- + Bloody, RLQ pain "pseudo-appendicitis": ***Yersinia enterocolitica***
    - Tx: supportive care, >1 wk --> abx
- + Chronic watery, AIDS: **cryptosporidium** "acid-fast oocysts"
- + Recent abx, nursing home, hospitalization: ***C. diff***
- + Hiking, IgA deficiency, chronic: ***Giardia lamblia***
    - Dx: stool antigen
    - Tx: metronidazole
- + Bloody, liver abscess: ***Entamoeba histolytica***
    - Tx: metronidazole
- ***EHEC O157:H7***: NO ABX (increased risk of HUS)
- *loperamide generally c/I
- + Chronic, malabsorption: ***Crohn's disease***
- **Osmotic gap**
    - = 290 - 2(stool Na + K)
    - Lots of electrolytes, low osmotic gap <50: ***secretory diarrhea***
    - "other nasty stuff", high osmotic gap >100: ***osmotic diarrhea*** i.e. lactase deficiency/malabsorption
        - Sx: improves with fasting
- + Flushing sx: ***carcinoid syndrome***
    - Dx: 5-HIAA
- + Low BMI, self-conscious: ***laxative abuse***
    - Dx: stool osmolarity < 250
- + black colon: ***melanosis coli***
    - No tx needed
- + recurrent pneumonia, sinusitis, Giardial diarrhea: ***Selective IgA deficiency***
    - Ddx: ***CVID*** (all Ig low)
- + pancreatic insufficiency, diarrhea from birth: ***Cystic fibrosis***
- + sugar-free, sour candies, cough drops, bloating: ***artificial sweetener-diarrhea***!
- + bloating, w/o alarm symptoms: ***lactase deficiency***
- + bloating, better sx with bowel movement: ***IBS***
    - Tx: TCA, serotonin-agonists (**alosetron** ae: ischemic colitis), loperamide, rifaximin
- + 45-60Y, chronic, no temporal assoc, NSAIDs, normal scope: ***microscopic colitis***
    - Tx: oral budesonide, laxative
- + fat malabsorption, microcytic anemia, dermatitis herpetiformis (extensors), osteoporosis (NBS: DEXA): ***Celiac disease***
    - Dx: 1. **anti-TTG** 2. EGD w/ biopsy
        - Can also see anti-gliadin or anti-endomysial Ab
    - Tx: gluten-free diet, dapsone for dermatitis
        - F/u non-adherence to diet, ADEK deficiency
    - Assoc with Hashimoto's, T1DM, IgA deficiency, *small-bowel lymphoma*
        - Ex. Thyroid replacement therapy not working d/t lack of absorption in small bowel
- + EtOH, hyperglycemia: ***chronic pancreatitis***
    - Dx: stool fat, white streaks on imaging
    - Tx: pancreatic enzyme replacement
- + resected bowel, scleroderma, diabetic gastroparesis, macrocytic anemia: ***bacterial overgrowth***
    - Et: bacteria <3 B12, folate! (@diphyllo)
- + middle aged man w joint pain, uveitis, neuro sx, cardiac sx: ***Whipples disease***
    - Dx: biopsy of small intestine
    - Tx: abx for 1 year
- + international travel, chronic diarrhea, weight loss, fatty stools: ***tropical sprue***
    - Tx: bactrim, tetracycline, folate

IBD

- + chronic, better w smoking: ***Ulcerative colitis***
  - Tx: proctocolectomy (@rectum)
  - Assoc *PSC* (high AP/GGT)
- + watery, abd pain, chronic fevers, fistulas: ***Crohn's***
- c/b: seronegative spondyloarthropathy, uveitis, erythema nodosum, pyoderma gangrenosum
- Dx: colonoscopy
  - NEVER get a barium swallow! --> triggers toxic mega
- Tx acute flare: steroids
- Tx chronic: aspirin-derivatives (ASA to colon)/TNF inhibitors, PCV23
  - 6-MP and azathioprine inhibited by gout drugs (xanthine oxidase, allopurinol)
    - Check TPMT!
      - If no metabolic activity, you have high risk of toxicity

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Ep. 217: Family Medicine Shelf Review Series 6 - Pulm (Version 2)

- Spirometry review
  - Indications? Suspected asthma or COPD
  - Obstructive pattern
    - FEV1/FVC < 0.7
      - Increases by > 12% after bronchodilator → asthma
    - Increased lung volumes
  - Restrictive pattern
    - FEV1/FVC > 0.8
    - Decreased lung volumes
  - DLCO - measures how effectively the lungs allow for the diffusion of O2
    - DLCO inversely proportional to thickness
      - Pulmonary fibrosis / interstitial lung disease → decreased DLCO
    - DLCO directly proportional to surface area
      - Emphysema → destruction of alveoli → decreased DLCO
    - Causes of increased DLCO? Increased pulmonary blood flow
      - Polycythemia
      - Pulmonary hemorrhage

- Restrictive lung disease with normal DLCO → mechanical ventilation problem
  - Diaphragmatic weakness: MG, ALS, GBS
  - Obesity
  - Anatomic problem: scoliosis, kyphosis, pectus excavatum

- CO poisoning
  - PaO2 normal
  - SatO2 decreased (but pulse ox will be normal)
    - Order CO-oximetry instead

- You suspect asthma in a pt but spirometry is normal. NBSM? Methacholine challenge
    - Mechanism? Methacholine is a muscarinic agonist that can cause bronchospasm. Dilute amounts won't affect people with normal airways, but will cause bronchoconstriction in asthmatics.

- Asthma + nasal polyps → aspirin-exacerbated respiratory disease (AERD)
    - Pathophys? Arachidonic acid can go down the prostaglandin pathway (via COX) or the leukotriene pathway (via LOX). Aspirin/NSAIDs inhibit COX so increase flux through the LOX pathway. Increased leukotrienes increase vascular permeability & cause bronchoconstriction.
    - Tx?
        - Leukotriene receptor antagonists (e.g. montelukast)
        - Lipoxygenase inhibitors (e.g. zileuton)
            - BUT it's hepatotoxic

- Asthma + renal problems → EGPA / Churg-Strauss
- Asthma sxs + really high IgE + infiltrates in upper lobes → ABPA
    - Dx? Skin-testing for Aspergillus

- Asthma treatment ladder
    - Mild intermittent
        - Daytime sxs twice/week or less
        - Nighttime sxs twice/month or less
        - Tx? SABA
    - Mild persistent
        - Daytime sxs >2x/week but not every day
        - Nighttime sxs 3-4x/month
        - Sxs not well-controlled on SABA
        - Tx? SABA + low-dose ICS
    - Moderate persistent
        - Daytime sxs every day
        - Nighttime sxs more than once/week (but not nightly)
        - Tx?
            - SABA + low-dose ICS + LABA
            - SABA + low-dose ICS + leukotriene antagonist
            - SABA + medium-dose ICS
    - Severe persistent
        - Sxs throughout the day
        - Nighttime sxs every night
        - Extreme limited in physical activity
        - Tx? Oral corticosteroids

- Drugs that can trigger asthma sxs? non-selective beta-blocker (e.g. propranolol, timolol)
- Asthma pt with high IgE levels. Which drug can help prevent attacks? Omalizumab (monoclonal Ab against IgE)
- Vaccines indicated for asthma pts?

  - Influenza
  - Pneumococcal
- Asthma pt on ICS now with dysphagia/odynophagia/white patches in mouth → thrush
  - Prevention? Wash out mouth after ICS
- Asthma pt on chronic oral corticosteroids. What other meds may help mitigate adverse effects?
  - PPIs to prevent peptic ulcer disease
  - Calcium & vitamin D supplementation +/- bisphonsates to prevent osteoporosis
- What should **NOT** be used as monotherapy in asthma? LABA
  - Increase mortality
- Asthma/COPD pt on theophylline. What other drugs should be avoided?
  - Macrolides (can reduce theophylline clearance)
  - Fluoroquinolones (can reduce theophylline clearance)

- Management for acute asthma exacerbation in the ER?
  - Albuterol/ipratropium neb (DuoNeb) + IV steroids
  - If severe: add IV Mg
  - Discharge with 3-4 days oral corticosteroids
  - What is a sign of decompensation in asthma exacerbation? normalization of PaCO2 (During asthma attack, pt is hyperventilating so PCO2 should be low. Rising CO2 suggests respiratory muscle fatigue.)
    - NBS? intubate

- Pt < age 45 with COPD + multiple family members with COPD. Consider what disease? Alpha-1 antitrypsin deficiency
  - Tx? IV pooled alpha-1 antitrypsin

- COPD treatment ladder
  - Start with SAMA or SABA
    - Choose SAMA if you have to choose
  - Add LAMA (e.g. tiotropium) or LABA (e.g. salmeterol, formoterol)
    - Don’t give SAMA + LAMA together
  - LAMA + LABA OR LABA + ICS
  - Oral steroids

- Indications for home O2
  - PaO2 < 55
  - O2 sat < 88
  - Polycythemia
  - Pulmonary hypertension

- Things that improve survival in COPD
  - Smoking cessation
  - Home O2 therapy
- Management for COPD exacerbation
  - DuoNebs (ipratropium-albuterol)

  - BiPAP (NIPPV = non-invasive positive-pressure ventilation)
  - IV corticosteroids
  - Azithromycin
    - Anti-inflammatory effects
  - Discharge on 3-5 days oral corticosteroids

- SOB in pts with terminal COPD? Opiate

- Low weight + nasal polyps + recurrent sinusitis + finger clubbing + fat malabsorption → CF
  - MC cause of bronchiectasis in the US
  - If sudden-onset severe abdominal pain? Intussusception
  - Tx?
    - Pancreatic enzymes + fat soluble vitamins
    - Chest physiotherapy
    - Inhaled dornase alfa or N-acetylcysteine
    - Inhaled tobramycin ppx
  - Dx? Sweat chloride testing

- Pt with lots of chronic coughing & sputum production. Linear streaks of CXR → bronchiectasis
  - Dx? High-resolution CT scan → tram-track pattern
  - MC cause in the US? CF
    - Causes restrictive lung disease
    - Pneumonia in CF pt < 20 → Staph aureus
      - Tx? Cover MRSA (e.g. vanc, linezolid, ceftaroline, tigecycline)
    - Pneumonia in CF pt > 20 → Pseudomonas or Burkholderia cepacia
      - Tx? Ceftazidime, cefepime, carbapenems (except ertapenem), aztreonam, fluoroquinolones, aminoglycosides
      - Many CF pts take inhaled tobramycin for ppx

Ep. 226: Iron labs

ep 226 notes were graciously provided by Divine Intervention from an anonymous contributor.

Ferritin = iron stores

- Increased
  - ***Anemia of chronic disease***: bacteria need iron to reproduce --> body tries to "starve out" the bacteria = **hepcidin** puts iron on bone marrow macrophages (storage) --> can barely see iron around the body
  - **Lead poisoning** --| ferrochelatase (iron-protoporphyrin --> heme), --| ALAD
    - Iron is building up in the bone marrow, around mitochondria because it cannot be conjugated
    - = "iron-overload" syndrome
  - ***Hereditary hemochromatosis***: C2A2Y2/HFE gene mutation
- Decreased
  - ***Iron deficiency anemia***: lacking iron all together, so not saving

TIBC = total iron binding capacity

- Opposite of ferritin: if you have lots of iron stored away, you will not go out and seek iron

Transferrin saturation = %sat of protein that moves iron around in the bloodstream

- Increased
    - **Lead poisoning**: iron overload state; tons of iron on board
        - 1. mitochondria bone marrow
        - 2. bloodstream
- Decreased
    - ***Anemia of chronic disease***: body is trying to sequester iron away from bacteria! "doesn't make sense for iron to run around willy-nilly, your body isn't stupid”
        - *does not spill into bloodstream ^^^ because hepcidin 1) locks up iron in macrophages 2) prevents reabsorption of iron in GI tract (duodenum)
    - ***Iron deficiency anemia***

MCHC = mean corpuscular hemoglobin concentration

- Concentration = mass/volume
- Increased
    - ***Hereditary spherocytosis***: aut dom mutation in RBC membrane
        - Pathophys: mutation in spectrin, ankyrin, band3.2 (RBC membrane proteins) --> too little membrane --> volume decreased
        - Increased MCHC
        - Dx: eosin-5-maleimide test, osmotic fragility
        - Tx: splenectomy
- Decreased
    - ***Iron deficiency anemia***
        - ~~Iron~~ + protoporphyrin = heme + globin = hemoglobin
            - Hemoglobin contributes to mass of RBC
            - decreased mass

Free erythrocyte protoporphyrin = binds with iron to create heme

- Increased
    - ***Iron deficiency anemia***: "if iron doesn't show up, protoporphyrin is left at the altar"
- Decreased
    - ***Porphyria cutanea tarda*** --| UROD
    - ***Intermittent porphyria*** --| PB deaminase
    - **Lead poisoning**

Reticulocyte count

- RBC lifespan = 4mos
    - If RBCs go into "live fast die young" phase --> lifespan = 30d
        - ~ companies have had to ramp up production to meet N95 demand
            - Implicates that you have enough raw materials for production: iron, B12, folate
- Increased
    - Tend to run out of folate/raw materials quickly
    - No quality control d/t rapid production
    - ***Hemolytic anemia***
    - ***Sickle cell disease***
    - ***Hereditary spherocytosis***
- Decreased
    - ***Iron deficiency anemia***
    - **B12/folate deficiency**

        - ***Aplastic crisis***

RDW

- Increased
    - ***Iron deficiency anemia***
        - *Your body cares more about the concentration vs amount i.e. hemoglobin*
            - i.e. *Iron deficiency anemia*: mass decreased --> body tries to keep up concentration by decreasing volume (MCV)
            - Big <--> small, as body keeps trying to compensate for concentration

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Ep. 228: CLEAN-SP 1 Palliative

- #1 cause of death in the US? Heart disease
    - But incidence is decreasing
- #2 cause of death in the US? Cancer
    - Trend is increasing
- Most healthcare spending goes to chronic disease
    - Most goes toward the last few years of a person's life
    - Increasing trend of hospitalizations & ICU admissions near end of life (e.g. last 30-60 days)
- Terminal illness = reasonable medical expectation that person won't survive beyond the next 6 months

- Palliative care is part of comprehensive care for chronic disease
- Principles of palliative care
    - Manage sxs
    - Avoid invasive diagnostic testing & exams
    - Goals of care discussions on a regular basis

- Why don't physicians initiate goals of care discussions?
    - Fear of bringing up death
    - Time constraints
- Communication skills for goals of care discussion
    - Normalize: this is a discussion I have with all my pts, I have these discussions so pts can maintain their autonomy in their care even if they become incapacitated
    - Start open-ended

- How to break bad news to pt
    - P = prepare for discussion
    - S = setting
    - P = patient's perception (assessing pt's understanding)
    - I = information (how much would you like to know?)
    - K = knowledge
    - E = empathy & acknowledge emotions
    - S = sharing next steps & summarize

- Advanced directives
    - Living will → patient complete while coherent, details specific wishes for various scenarios
    - Healthcare proxy / durable POA → person that the pt designates to make healthcare decisions if they cannot

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Ep. 230: CLEAN-SP 2 Quality/Safety

- Quality Control
    - Example: resident checks EVERY med student note to make sure if has all the required components

- Quality Assurance
    - Periodic audit
    - Example: resident does weekly checks of med student notes to make sure they're up to par

- Quality improvement
    - You've identified a problem then designed an intervention to improve things

- Hawthorne Effect = people act differently when they know they're being observed

- Weber Effect = if you are tracking adverse events, the incidence of that adverse event will go down (for the first year)

- Safety Champion = person in charge of quality & safety

- High value care
    - Value = service x quality / cost
    - Example: residents are a high value resource because they provide a lot of services that are pretty high quality at a low cost

- PDSA Cycle is used for Quality Improvement
    - P = plan
    - D = do
    - S = study
    - A = act

- Lean model = find inefficiencies in a process then eliminate them
    - Goal = reduce waste

- Data-driven improvement model = "DMAIC"
    - D = define
    - M = measure

  - A = analyze
  - I = improve
  - C = control

- Six Sigma Model = no more than 3 defects per million products (this is 6 standard devs)
  - High-fidelity process
  - Goal = eliminate defects

- FMEA = failure mode & effects analysis
  - “What are the different ways in which something might fail?”
  - “What are the consequences of these failures?”
  - PROSPECTIVE TOOL
  - Find the different ways this thing can fail and rank them, then focus on the biggest error

- Root cause analysis
  - Like FMEA but RETROSPECTIVE TOOL

- Swiss cheese model
  - Multiple steps in a process need to fail (holes in the cheese align) in order to cause the error
  - When you design a process, you want to create multiple safeguards to error
  - Example: ordering the wrong dose (off by a zero)
    - the EMR flags the order
    - the pharmacist sees that the dose is not reasonable

Ep. 231: Military Part 2

1. Vaccines/protection for military personnel:
   I. MMRV, Tdap, typhoid, influenza, polio, hep A + depending on location may give (yellow fever, anthrax, smallpox).
   II. DEET on skin and permethrin on clothes
   III. If medic→ Hep B
   IV. Sexually active→ Hep B
   V. Outbreak of meningitis→ N. meningitidis, use ceftriaxone or ciprofloxacin for treatment and rifampin ppx for all close contacts.
2. Returning service member (RSM) returning from Egypt with hematuria or portal hypertension: Schistosomiasis (hematuria→ haematobium) or (Portal htn. → mansoni)
3. MCC of diarrhea in military → Norovirus
4. Peace keeping mission in Africa with bleeding, petechiae, contact with WILD ANIMALS, or dead bodies→ Ebola or Marburg viruses, spread via fomites or body fluids. No Rx.

5. RSM from Russia, China, Korea, or stationed at Utah, New Mexico, Arizona, Colorado, had contact with mice (deer mouse, "worked in barn") presenting with high fever, myalgias/flu-like symptoms, bilateral INTERSTITIAL pulmonary edema→ Hantavirus (can have hemorrhage as well). No known treatment.
6. RSM from Hawaii or navy has conjunctival injection, jaundice → Leptospirosis.
    a. Particularly bad form = WEIL's Disease (anemia, very high creatinine, jaundice) → attacks the liver and kidneys. Use doxycycline from prevention
7. RSM with Hemoptysis, widened mediastinum ± necrotic ulcer on neck→ Anthrax (poly d glutamate capsule). Can present as Hemorrhagic mediastinitis → widened mediastinum on CXR. Rx with doxycycline or fluoroquinolone. There is a vaccine available for service members.
8. Malaria PPX (asia, Africa, ME) → atovaquone + proguanil, or mefloquine, primaquine (for vivax and ovale- tertian fever, have hypnozoite form), or chloroquine (high resistance), or doxycycline.
    a. P. malariae = quartan fever
    b. P. falciparum = fever at odd intervals (most severe manifestations → cerebral malaria, pulmonary edema, renal failure)
9. RSM with exposure to animal or animal products or unpasteurized milk, undulant fevers and PROFUSE SWEATING→ Brucellosis, requires very low dose to get infected, tends to recur after treatment. Rx with doxy and rifampin, if recurring give aminoglycosides
10. Contact with dogs/cats/pigs and one of the most common causes of bloody diarrhea→ Campylobacter jejuni (Keep in mind, association with Gullian barre syndrome and Reiter's syndrome)
11. Cattle or sheep birth, **pneumonia** or chest pain (due to culture -ve endocarditis) → Q fever due to Coxiella Burnetii. Do not confuse Q fever with brucellosis (pneumonia is unique to Q fever)!
12. RSM from Mexico, ME, North/East Africa, South America, Asia ("tropical areas") has fevers, weight loss pancytopenia, hepatosplenomegaly, DARK SKIN LESIONS → Leishmaniasis (visceral form due to donovani), carried by sandflies, may see amastigotes on microscopy from tissue biopsy. Rx with sodium stibogluconate or amphotericin B.
13. RSM with fever, neck rigidity, headache, myalgia, LP → Opening pressure is not high, WBC not high (but + lymphocytes), protein is not high, not high glucose → West nile virus.
14. RSM with trouble swallowing (achalasia), chronic constipation (megacolon or hirschsprung), S3 heart sound (dilated cardiomyopathy)→ Chagas disease, spread by reduviid bug, **specific→ periorbital edema (Romana sign)**
    a. Rx: nifurtimox, benznidazole.
15. RSM→ worked with turtles or pets, or lots of eggs or poultry and presents with bloody diarrhea, increased WBC (mostly neutrophils)→Nontyphoidal or enteritidis salmonella→**DON'T TREAT IT.**
16. RSM→ don't forget TB. Presents with chronic cough, fever, hemoptysis, night sweats right upper lobe infiltrate/cavitary lesion on CXR. Treatment = RIPE regimen for 2 months then drop 2 and continue with rifampin and isoniazid. DON'T forget B6 vitamin.
17. Before primaquine treatment for p vivax or ovale, check those patients (men, X-linked inheritance) for G6PD deficiency.
18. Patient going to a place with a high incidence of leptospirosis → give doxycycline as prophylaxis
19. RSM with very high fevers, rash, bad myalgias (bone break fevers), bleeding (FOBT + stools, epistaxis, petechiae, hematuria, gingival bleeding), positive tourniquet test (petechiae below blood pressure cuff), ALT elevated maybe AST, usually in a south American country, thrombocytopenia→ Dengue hemorrhagic fever (aedes mosquito)
    a. Bug causes increased capillary permeability

20. Chikungunya fever does not cause hemorrhage; identical to dengue but without the hemorrhage. Do not confuse Dengue and Chikungunya.
21. Zika usually in a woman with a child who has microcephaly and intracranial calcifications.
22. Yellow fever → jaundice, hepatomegaly not present in dengue. Re-hydrate these patients give supportive care.

CROSS CHECKED? YES

Ep. 234: CLEAN-SP 2 Medication/Transition of Care

- Medication error = any error that occurs between the clinician prescribing the medication and the medication arriving to the pt

- Adverse drug event = any type of harm that is experienced by a pt as a result of taking a drug

- RF for adverse drug event
  - #1 = polypharmacy
  - Elderly pt
  - Pediatric pt (weight-based dosing can be confusing)
  - Low health literacy
  - Drugs that look alike
    - Similar tablets
    - Similar names

- Screening tools for inappropriate rx in the elderly
  - BEERS criteria
  - STOPP criteria

- 4 drugs responsible for 50% adverse drug events
  - Insulin
  - Warfarin
  - Antiplatelets
  - Opioids

- Drugs NOT to prescribe
  - Benzos in the elderly
  - Opioids for dental procedures or small surgical procedures

- Pathway from clinician to pt & ways to prevent error
  - Clinician orders
    - Prescribe conservatively (reduce # of rxs)
    - Computerized order entry systems w/ clinical decision support system (e.g. “This pt has valvular Afib dx in EHR. NOAC may not be appropriate”)

        - Medication reconciliation
    - Pharmacist transcribes
        - EHR has helped eliminate transcribing errors due to poor handwriting
    - Pharmacist dispenses
        - Pharmacist must oversee the process
        - Tall man lettering (helps distinguish drugs with similar names)
        - Automated dispensing cabinets
    - Nurse/caregiver administers
        - 5 Rights Rule
            - Right med
            - Right dose
            - Right time
            - Right route
            - Right pt
        - Barcode scanners help ensure you're giving right med to right pt
        - Minimize interruptions in the process of med administration
        - Use a smart infusion pump for IV meds
        - Use a multicompartment medication device when pt is discharged on lots of meds
- IV meds are more prone to error than oral meds due to more calculations required for dosing
- MC type of medication error? Administering med at the wrong time

- Opioid safety
    - Biggest issue is overprescribing
    - Appropriate for:
        - Acute traumatic pain
        - Cancer-related pain
        - SOB in c/o cancer (morphine)
    - Use prescription monitoring program
    - Use short course of opioids
    - Use only when it's clinically warranted

- Transition of care = moving of pt from one healthcare setting to another
    - E.g. ward → ICU
    - E.g. hospital → LTAC
- Two mostly likely complications of poor transition of care
    - Readmission
    - Adverse drug events
- Measures to improve transition of care
    - Clearly written discharge instructions
    - Explain instructions to pt & use teach back
    - Give detailed records to rehab facility/nursing home
    - Medication reconciliation
    - Arrange definitive f/u (get them an appt!)
    - Discharge checklist

- Reduce error in pt handoffs
    - Well-written instructions for the other team
    - Done in an environment free of interruptions
    - Use I-PASS method
        - I = illness severity
        - P = pt summary
        - A = action list (to-dos for the night team)
        - S = situation awareness (if-then statements)
        - S = synthesis by receiver (teach back from new team)

- SBARR method for nurse-physician or physician-physician communication
    - S = situation (e.g. this pt's BP is going down)
    - B = background (e.g. hx of MIs, recurrent V-tach eps)
    - A = assessment (e.g. I see ST elevations. I think he's having another MI)
    - R = recommendation (e.g. please put the pt on O2. I'm coming down)
    - R = response

Ep. 239: Ob/Gyn Risk Factors

- #1 RF for postpartum depression → hx of depression

- Most reliable indicator of successful labor induction → Bishop score

- MCC of infertility → ovulatory dysfunction (PCOS)

- MC late-onset adverse effect of pelvic radiation → vaginal stenosis

- #1 RF for uterine sarcoma → pelvic radiation

- #1 RF for squamous cell carcinoma of vagina → HPV

- #1 RF for clear cell carcinoma → in-utero exposure to DES

    - DES results in t-shaped uteruses and 2nd trimester losses

- #1 RF for vulvar carcinoma → HPV
    - **Note**: If “HPV” is not listed, choose “lichen sclerosus”
    - NBSIM? Punch bx

- #1 RF for post-partum endometritis → recent C-section

- #1 RF for pelvic septic thrombophlebitis → hx of post-partum endometritis

- #1 Prognostic Factor for breast cancer→ involvement of axillary lymph nodes

- What 3 prognostic factors indicate worse outcomes for gestational trophoblastic disease?
    - Mets to liver or brain
    - ↑↑↑ b-HCG
    - More time between pregnancy and gestational trophoblastic disease

- #1 Prognostic Factor for vulvar cancer → lymph nodes mets then lesion size

- #1 Prognostic Factor for endometrial cancer → stage

- MC presenting complaint is vaginal bleeding

- #1 RF for endometriosis → **family history** of endometriosis

- MCC of DIC during pregnancy → placental abruption

- #1 RF for placenta previa → previous C-section

- #1 RF for placental abruption → hx of placental abruption or hypertension

- #1 RF for preterm labor → hx of preterm labor, *Ureaplasma* or *Gardnerella vaginalis*

- #1 RF for cervical incompetence → LEEP or conization

- #1 intervention prevent: NEC; intraventricular hemorrhage; and NRDS → betamethasone

- Preventive measure in PPROM to prevent infection → decreasing cervical exam numbers

- #1 RF for IUGR → hx of IUGR gestations

- #1 RF for fetal macrosomia → maternal diabetes

- #1 RF for fetal tachycardia → maternal fever

- #1 RF for post-partum hemorrhage → uterine atony

- PDA → premature

- #1 RF for ectopic pregnancy → hx of ectopic pregnancy

- #1 RF for uterine rupture → uterine scar d/t previous C-section

- #1 RF for breast cancer → increasing age

- #1 RF for pre-eclampsia → hx of pre-eclampsia

- #1 RF for uterine inversion → hx of uterine inversion

- #1 RF for chorioamnionitis → PROM
    - NBSIM? GBS PPx if > 18h

- What are 2 RF's for gestational trophoblastic disease?
    - Nulliparity
    - Extremes of age (really young or really old)

- Indications to administer intrapartum penicillin as *GBS* PPx?
    - Child with *GBS* sepsis regardless of culture
    - +Urine culture at any point in pregnancy
    - If unknown status
    - Woman with ruptured membranes for ≥ 18h

  - Intrapartum fever

- Indications to give Rhogam?
  - At 28 wks
  - During any procedure
  - Within 3 days post-partum
  - During uterine cerclage
  - During ectopic pregnancy
  - Pregnant pt involved in MVA
  - Any other event that can cause maternal-fetal blood mixing

CROSS CHECKED? YES

Episode 242: Dermatology Part (1 of 3)

NBME likes to give buzzwords for Derm. However, look up pictures!!

Atopic Dermatitis

- Pt presents with dry skin and intense pruritus
- On PE erythematous papules and vesicles crusty lesions and oozing.
- Fam. hx. of asthma.

Eczema presentation:

- adults: flexor surfaces
- children: extensor surfaces (think antecubital fossa) first before flexor surfaces
- What is the classic finding in a person with chronic atopic dermatitis? Lichenification (what happens when you scratch a lot)
- MC infectious agent or complication of eczema? staph aureus.
- What is the type of hypersensitivity reaction in eczema? Type 1

Contact dermatitis

- Pt acquired nickel with a lot of itching around wrists? Contact dermatitis
- What are other types of allergic reactions in contact dermatitis? medication patches, poison ivy
- Grouped vesicles in a linear distribution -> poison ivy

Psoriasis

- See rash at extensor surfaces, think psoriasis

Xerotic eczema

- 79 y/o (old people in general) that presents to dermatologist bc really dry skin on the left shin (tree-bark appearance at lower extremities). On PE skin is red/dry, neck-like fissures. Skin reaction gets worse in the cold, dry winter months.

Treatment for eczema, general terms

- Tx emollients. Topical glucocorticoids
- Special cases:
    - Do NOT use topical glucocorticoids on dermatitis of the face
    - One of the MCCs of acne on the face on NBME exams? topical corticosteroids

Plaque psoriasis

- 36 y/o Mexican male with thick erythematous plaques with silver scales on elbow (Extensor surface)
- Show on elbow, knees, scalp, ears, genitalia
- Classic exam findings in psoriasis -> very thick NAILS. yellow, nail-pitting, Hispanic
- Things that worsen: beta-blocker, NSAIDS, ace inhibitor, oral steroids, tetracycline

Guttate psoriasis

- Pt. with papules and plaques on their trunk. Looks like tiny tiny drops.
- Patient recently developed group A skin infection (i.e., strep pyogenes)
- Tx. Vitamin D analog - topical calcipotriene; retinol; anthralin; or tar prep

NEVER give oral/IV steroids for psoriasis. Systemic steroids can worsen psoriasis.

Erythroderma

- Pt with a hx of psoriasis and is taking steroids. Skin turns really red.
- Complication: electrolyte abnormality (loss of fluid)

Lichen planus

- Pt. has noticed a lot of pruritus these past few days on wrists and ankles. Noticed purplish papules shaped like polygons.
- Tx. topical corticosteroid

Pityriasis rosea

- Pt over the last two weeks has pruritus. Noticed circular or rectangular lesion on trunk (Herald patch), under axillae and lasts for weeks.
- Tx. topical steroids and antihistamine for pruritus

Seborrheic dermatitis

- Pt. has oily, scaly lesion on eyebrow on scalp, nasolabial folds, chin or perineal cysts
- Tx. selenium sulfide shampoo
- If pt is young person sexually active with tons of lesions that resemble seborrheic dermatitis -> screen for HIV
- Typically also seen in patients with Parkinson's disease

Rosacea

- 35 y/o female with redness of cheeks/nose whenever she eats spicy food or drinks alcohol has facial flushing. Can see papules/pustules.
- Usually >30 y/o female
- Don't confuse this patient with malar rash on lupus. Rash of lupus SPARES nasolabial folds. People with lupus DO NOT have papules, pustules on face or flushing episodes.

Adrenal Tumor (DHEA) or Gonadal (Sertoli-leydig tumor)

- Woman who suddenly develops severe acne and hirsutism with menstrual problems or signs of virilization.

Hidradenitis suppurativa

- Pt. with a history of diabetes who have had chronic lesions under axilla, breasts or in gluteal clefts. Nodules, cysts, comedones, a lot of scarring.
- Pathophys: apocrine sweat glands.
- Tx. Clindamycin or Rifampin also Infliximab
- Definitive Tx. excision of lesions

Acne vulgaris

- Open and closed comedones, papules, pustules, nodular lesions. Distribution at face, neck or upper trunk
- Tx. topical retinoid or salicylic acid or benzoyl peroxide.
    - Not work? Add a topical antibiotic (e.g., erythromycin, clindamycin).
        - Not work? Add an Oral antibiotic (tetracycline)
            - Not work? Give isotretinoin

- If pt has acne, visual headaches worse in the morning -> idiopathic intracranial hypertension.
- What labs to order before giving isotretinoin? LFT's, B-HCG
- Don't give preggos isotretinoin or tetracycline
- Pt with PCOS + acne (hyperandrogenism) DOC = OCP's.

Bacterial folliculitis

- Athletic patients with pustules and papules on the scalp (anywhere with hair) centered around hair follicles.
- MCC: staph aureus

- Tx. mupirocin

Hot tub folliculitis
- Pt in a community pool/hot tub liquidly chlorinated
- MCC: pseudomonas

Hot tub lung
- MCC: mycobacterium avium intracellularly complex

Dermatophyte Skin Infections (Tinea
- MCC trichophyton tonsurans > microsporum species > epidermal phyton species

Tinea pedis
- Scaling from toes to areas of achilles heel (athlete's foot)

Tinea corporis (ringworm)
- Erythematous circular red lesion with vesicles with "Central clearing"

Onychomycosis / nail fungus
- Yellow, thick nails or really white. Distal edge (farthest away from skin is elevated)

Cutaneous candidiasis.
- Red, itchy skin with red satellite lesions. After scraping- > KOH prep see spores and pseudohyphae.

Tinea versicolor or pityriasis versicolor
- Hypopigmented macules on upper trunk or back. On prep: "spaghetti and meatball pattern"
- MCC: malassezia furfur

Tx general
- All tinea: topical antifungals: Clotrimazole (any -azole)
  - Special exception:
    - Tinea Capitis (head): oral medication - terbinafine, griseofulvin
    - Griseofulvin (penetrates keratin containing tissue)
    - cutaneous candida: topical nystatin or other azole
    - Tinea versicolor: selenium sulfide or topical azole

Molluscum contagiosum
- Pt. with umbilicated papule on skin (can de adult or kid)
- cryotherapy or curettage
- Remember assoc. with HIV!

CROSS CHECKED? YES

Episode 243: Water Soluble Vitamins

- Pt found on street by police, brought into ED. Swaying side to side + nystagmus + doesn't know how he got to hospital → Wernicke's encephalopathy
    - Population?
        - Alcoholics
        - Hyperemesis gravidarum
        - Eating disorders
        - Starvation
    - Triad? Confusion + ophthalmoplegia + ataxia
    - Pathophys? Thiamine deficiency
        - B1 is part of the TLCFN cofactor group (cofactor for pyruvate dehydrogenase complex, alpha-ketoglutarate dehydrogenase, branching ketoacid dehydrogenase)
            - Defect in branching ketoacid dehydrogenase → maple syrup urine disease
        - B1 is a also a cofactor for transketolase
            - Transketolase dysfxn implicated in Wernicke's
    - Neuroanatomical association? Hemorrhagic infarction of the mammillary bodies
    - What if they have confabulation + amnesia → Korsakoff syndrome
    - Prognosis?
        - Wernicke's → reversible
        - Korsakoff → permanent
    - Tx? Give thiamine BEFORE glucose
    - Other presentations of thiamine deficiency?
        - Generalized edema + other signs of CHF → Wet beriberi
        - Ataxia + paralysis + sensory sxs → Dry beriberi

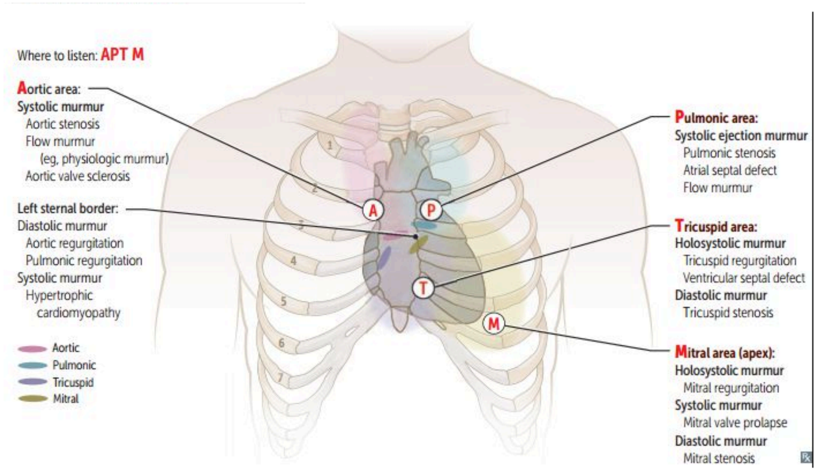
- B2 = riboflavin
    - Required for production of FADH2
        - Part of the TLCFN cofactor group
- B3 = niacin
    - Required for production of NADH/NADPH
    - Presentation of deficiency?
        - dermatitis + chronic diarrhea + dementia → pellagra
    - Causes of niacin deficiency?
        - Hartnup disease
            - Can't reabsorb neutral AAs (e.g. tryptophan, which is used to make niacin & serotonin)
        - Carcinoid syndrome
            - All the tryptophan is being shunted towards serotonin production, so there's not a lot available to produce niacin

            - Presentation? Flushing episodes + chronic diarrhea + holosystolic murmur at LLSB that increases w/ inspiration (likely tricuspid regurg)
            - Sxs only occur once metastasized
                - Liver metabolizes the serotonin
            - Why only R-sided heart murmurs?
                - Lungs also metabolize serotonin
    - Therapeutic use of niacin? Best way to raise HDL
        - Better than statins!
        - AE? Flushing + itching
            - Tx? NSAIDs
- B5 = pantothenic acid
    - Used to make coenzyme A
- B6 = pyridoxine
    - Cofactor for transaminases
    - Cofactor for glutamate decarboxylase (glutamate → GABA)
    - Cofactor for ALAS (1st step in heme synthesis)
    - Presentation of deficiency?
        - Sideroblastic anemia
        - Seizures
    - Drug that causes B6 deficiency? Isoniazid
        - Other AE? drug-induced lupus
- B7 = biotin
    - Cofactor for carboxylase enzymes
    - Very rare, it's difficult to get biotin deficiency
    - Odd cause of deficiency? egg whites contain avidin protein, which binds biotin and can cause deficiency
- B9 = folate
    - Necessary for DNA synthesis
    - Converts homocysteine → methionine
    - Causes of deficiency?
        - Alcoholism
            - Alcohol inhibits conjugase, which helps us reab
        - Small bowel reabsorptive disorders
        - Poor nutrition (body stores of folate only last months)
        - Chronic hemolytic anemia (e.g. sickle cell, hereditary spherocytosis)
        - Drugs
            - Phenytoin
            - Methotrexate
                - Rescue agent? Leucovorin (folinic acid analog)
            - TMP-SMX
    - Presentations of deficiency?
        - Megaloblastic anemia
        - Neural tube defects in fetus
    - Lab findings? Elevated homocysteine
- B12 = cobalamin

    - Converts homocysteine → methionine
    - Converts methylmalonyl-CoA → succinyl-CoA
    - Presentations of deficiency?
        - Megaloblastic anemia
        - Dementia
        - Subacute combined degeneration
            - Damage to dorsal columns + lateral corticospinal tract
    - Causes of deficiency?
        - Pernicious anemia
        - Crohn’s affecting terminal ileum
        - Strict vegan diet
        - Diphyllobothrium latum (fish tapeworm)
    - Lab findings? Elevated homocysteine **AND** MMA
- Vitamin C
    - Cofactor for synthesis of collagen
    - Presentation of deficiency?
        - Bleeding gums + poor wound healing → Scurvy
    - Therapeutic use? Tx of methemoglobinemia
        - Keeps iron in the Fe2+ form

CROSS CHECKED? NO

Ep 244: (Cardiac Valvular Disorders)


Where to listen: APT M
Aortic area:
Systolic murmur
Aortic stenosis
Flow murmur
(eg, physiologic murmur)
Aortic valve sclerosis
Left sternal border:
Diastolic murmur
Aortic regurgitation
Pulmonic regurgitation
Systolic murmur
Hypertrophic cardiomyopathy
Aortic
Pulmonic
Tricuspid
Mitral
A
P
T
M
Pulmonic area:
Systolic ejection murmur
Pulmonic stenosis
Atrial septal defect
Flow murmur
Tricuspid area:
Holosystolic murmur
Tricuspid regurgitation
Ventricular septal defect
Diastolic murmur
Tricuspid stenosis
Mitral area (apex):
Holosystolic murmur
Mitral regurgitation
Systolic murmur
Mitral valve prolapse
Diastolic murmur
Mitral stenosis
1
2
3
4
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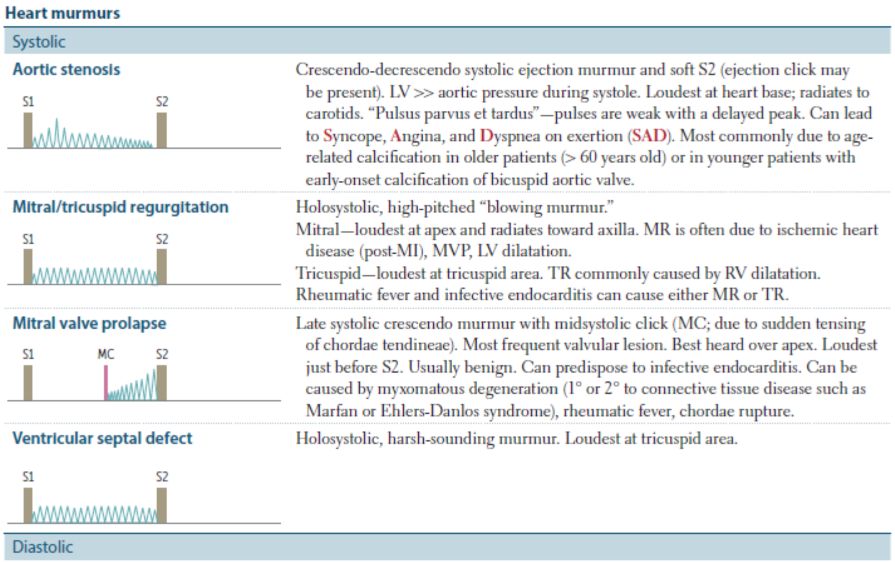
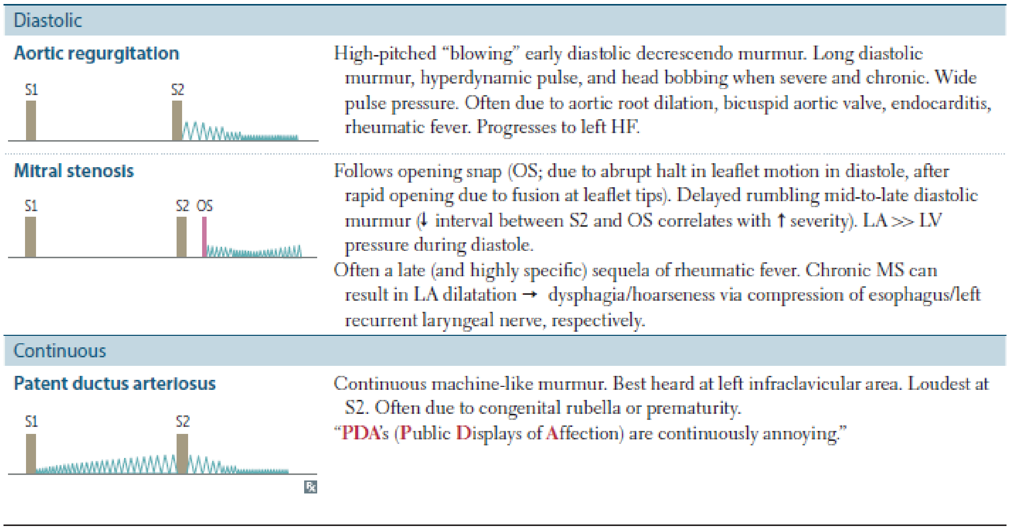
7


S1
S2
S1
S2
S1
MC
S2
S1
S2

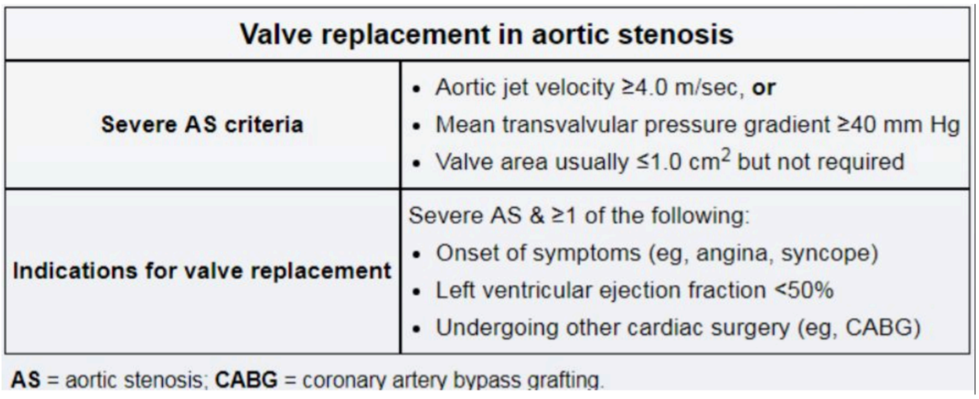
Heart murmurs

Systolic	
Aortic stenosis	Crescendo-decrescendo systolic ejection murmur and soft S2 (ejection click may be present). LV >> aortic pressure during systole. Loudest at heart base; radiates to carotids. "Pulsus parvus et tardus"—pulses are weak with a delayed peak. Can lead to Syncope, Angina, and Dyspnea on exertion (SAD). Most commonly due to age-related calcification in older patients (> 60 years old) or in younger patients with early-onset calcification of bicuspid aortic valve.
Mitral/tricuspid regurgitation	Holosystolic, high-pitched "blowing murmur." Mitral—loudest at apex and radiates toward axilla. MR is often due to ischemic heart disease (post-MI), MVP, LV dilatation. Tricuspid—loudest at tricuspid area. TR commonly caused by RV dilatation. Rheumatic fever and infective endocarditis can cause either MR or TR.
Mitral valve prolapse	Late systolic crescendo murmur with midsystolic click (MC; due to sudden tensing of chordae tendineae). Most frequent valvular lesion. Best heard over apex. Loudest just before S2. Usually benign. Can predispose to infective endocarditis. Can be caused by myxomatous degeneration (1° or 2° to connective tissue disease such as Marfan or Ehlers-Danlos syndrome), rheumatic fever, chordae rupture.
Ventricular septal defect	Holosystolic, harsh-sounding murmur. Loudest at tricuspid area.
Diastolic	


S1
S2
S1
S2
OS
S1
S2

Diastolic	
Aortic regurgitation	High-pitched "blowing" early diastolic decrescendo murmur. Long diastolic murmur, hyperdynamic pulse, and head bobbing when severe and chronic. Wide pulse pressure. Often due to aortic root dilation, bicuspid aortic valve, endocarditis, rheumatic fever. Progresses to left HF.
Mitral stenosis	Follows opening snap (OS; due to abrupt halt in leaflet motion in diastole, after rapid opening due to fusion at leaflet tips). Delayed rumbling mid-to-late diastolic murmur (↓ interval between S2 and OS correlates with ↑ severity). LA >> LV pressure during diastole. Often a late (and highly specific) sequela of rheumatic fever. Chronic MS can result in LA dilatation → dysphagia/hoarseness via compression of esophagus/left recurrent laryngeal nerve, respectively.
Continuous	
Patent ductus arteriosus	Continuous machine-like murmur. Best heard at left infraclavicular area. Loudest at S2. Often due to congenital rubella or prematurity. "PDA's (Public Displays of Affection) are continuously annoying."

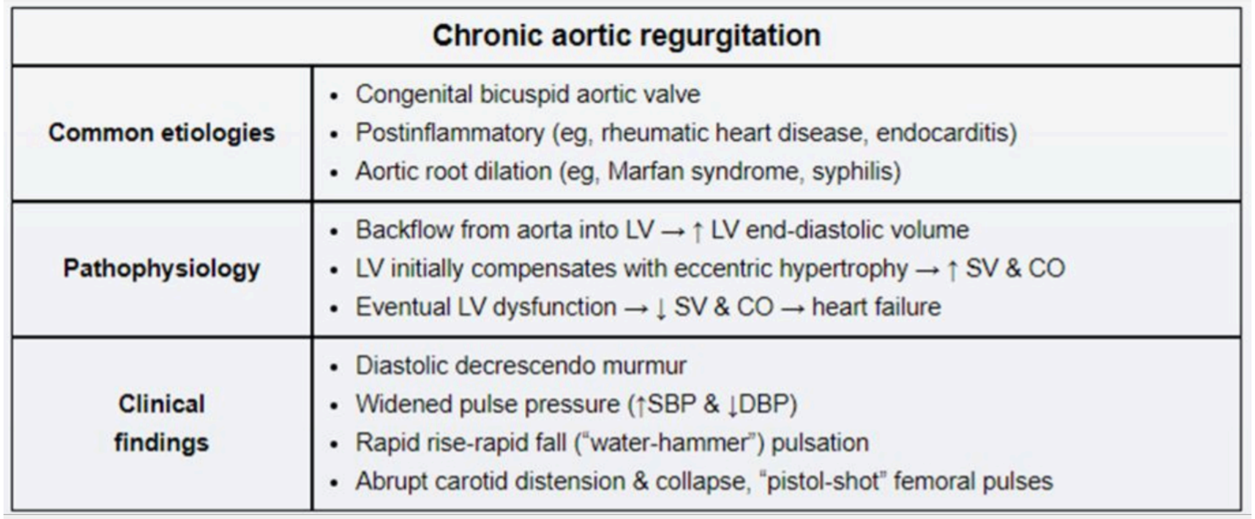
- Q1 79 m with syncopal episodes, and shortness of breath when mowing lawn or with physical activity
  - Think ***Aortic Stenosis***
  - These pts usually above 65, old guy with syncopal episodes almost always do this. Angingal syncopal HF symptoms.
  - Point of Maximal impulse laterally displaced causes concentric hypertrophy of L ventricle.
  - Old guy + Syncopal episodes = AS
  - Heard best at R upper sternal border (imagine the anatomy to help)
  - Radiates to carotids. *Pulsus parvus atardis* = tardy means late takes a long time to feel carotid pulse even though you feel heart pumping
  - In Aortic Stenosis the valve is calcified!
  - You can see it in a younger person, when? If they have a **Bicuspid** aortic valve. Normally there are 3 cusps/leaflets, if only 2 cusps they have to do more work and wear out and calcify. Turner syndrome pts classically has a bicuspid aortic valve.
  - Intensity increases with anything that puts more blood in the L ventricle, like giving fluid bolus.

- Replace valve to treat. Think "**ASH**" when considering replacement, **a**ngina, **s**yncope, **H**F, HF meaning you definitely need to replace.
- You have to replace you can't do valvotomy cause valve is too calcified to balloon
- You can usually answer a question like this even without the audio if you consider the scenario (but it is crescendo-decrescendo systolic ejection murmur over 2nd R-ICS)
- 

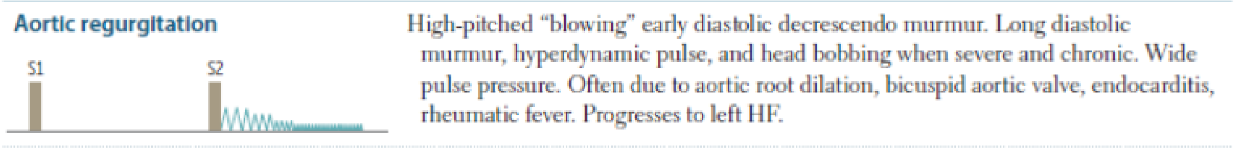
Valve replacement in aortic stenosis	
Severe AS criteria	• Aortic jet velocity ≥4.0 m/sec, **or** • Mean transvalvular pressure gradient ≥40 mm Hg • Valve area usually ≤1.0 cm^2 but not required
Indications for valve replacement	Severe AS & ≥1 of the following: • Onset of symptoms (eg, angina, syncope) • Left ventricular ejection fraction <50% • Undergoing other cardiac surgery (eg, CABG)

AS = aortic stenosis; **CABG** = coronary artery bypass grafting.

- **Aortic Regurg**
  - Heard best at the left **sternal border** OR **left lower sternal border**, think of the direction of regurg anatomically to help remember.
  - **Diastolic** Murmur
  - If the aortic regurg is really bad it can also be heard at the *right sternal border*, rarer
  - Hints to diagnose: if bp is 120/40 or if 150/50 (ie **wide pulse pressures**), it's a giveaway to aortic regurg.
  - Mechanism of widened pulse pressure: The systolic pressure increases because it is correlated to cardiac output. Cardiac output is increased in aortic regurgitation because preload increases when the volume is regurgitated back. Diastolic pressure is related to systemic vascular resistance. In aortic regurg blood can relax and go back into the heart, lowering SVR and hence diastolic BP (see divines explanation it's a lot better). Another example of widened pulse pressure is Patent Ductus Arteriosus, systolic is up because there is an extra source of preload (the PDA), and also a conduit for blood to go during the relaxing phase of diastole, lowering SVT and diastolic BP
  - **Head Bobbing, hyperdynamic pulse**, are a result of a wide pulse pressure phenomenon.
  - *Treat* pts with something that will *lower afterload*, as it will lessen the amount of regurgitation. If less afterload blood has more motivation to move forward and not regurg back.

    - Other notes:
    - 

Chronic aortic regurgitation	
Common etiologies	• Congenital bicuspid aortic valve • Postinflammatory (eg, rheumatic heart disease, endocarditis) • Aortic root dilation (eg, Marfan syndrome, syphilis)
Pathophysiology	• Backflow from aorta into LV → ↑ LV end-diastolic volume • LV initially compensates with eccentric hypertrophy → ↑ SV & CO • Eventual LV dysfunction → ↓ SV & CO → heart failure
Clinical findings	• Diastolic decrescendo murmur • Widened pulse pressure (↑SBP & ↓DBP) • Rapid rise-rapid fall ("water-hammer") pulsation • Abrupt carotid distension & collapse, "pistol-shot" femoral pulses

    - 

Aortic regurgitation

High-pitched "blowing" early diastolic decrescendo murmur. Long diastolic murmur, hyperdynamic pulse, and head bobbing when severe and chronic. Wide pulse pressure. Often due to aortic root dilation, bicuspid aortic valve, endocarditis, rheumatic fever. Progresses to left HF.

- Q: Patient had URI 30 years ago, now having palpation, EKG shows afib, what's your diagnosis? **Mitral Stenosis**
    - Diastolic murmur with opening snap
    - Heard best at apex (like all mitral murmurs)
    - #1 RF for Mitral Stenosis is rheumatic fever
    - #1 RF For AFib is Mitral Stenosis. Left Atrium dilates as it is pushing against resistance, causing AFib
    - If patient is Afib due to a valvular problem (like mitral stenosis), the only anticoag you can use to treat them (chadsvasc) is **WARFARIN** , you CAN'T use a NOAC

- Q: Pt is 6'5 with hyperflexible joints, they are known to have Ehlers-Danlos syndrome, they also have a midsystolic murmur heard best at the apex with a click, what is the cause of the murmur? **Mitral Valve Prolapse**
    - It is very similar to *mitral regurg*, MVP is kind of like a subset of mitral regurg
        - Lets compare the two. **Mitral Regurg** is *holosystolic*, while MVP is midsystolic with a click.
        - How to make MR louder? By putting more blood in the left side of the heart, increasing preload via squatting, going standing to supine, or bolus of saline. Can also be made louder through the handgrip maneuver, which increases afterload, blood will be like hey it's harder for me to go forward, so i guess i'll just regurg back through the mitral valve
    - MVP also has blood regurg, this is because the valve leaflets do not overlap well.
        - How do we make the leaflets overlap better? Also by putting more blood in the left ventricle of the heart, essentially erase the prolapse and decrease the amount of regurg. This also makes the murmur sound LESS intense. So if squat will increase preload, make

    - murmur less intense. If you increase afterload via handgrip, this will also make murmur less intense.
  - So anything that increases preload or afterload makes MR louder, and MVP less intense
  - MVP is caused by myxomatous degeneration of the valve.
  - MVP associated with Marfan's and Ehlers Danlos (and ADPKD). Also in people with psych disorders, mostly in younger people on NBME exams.

- Holosystolic Murmur at the left lower sternal border? **VSD**
  - VSD is most common congenital heart defect
  - Blood initially flows from left to right, but eventually after pulmonary hypertension develops blood flows from R to L shunt, this is called Eisenmenger syndrome

- Fixed Split S2? **ASD**
  - But this is too buzz wordy, NBME will probably be like, you hear split S2 on inspiration *and* expiration, what is murmur? ASD.
    - Normally only S2 split in inhalation, reason being inhalation causes increased blood return to the right side of heard, so it takes a bit longer for it to pump it compared to the left side of the heart, so valve closes a bit later, hince S2 normal physiological split in inhalation
    - So if you see person with S2 split on EXPIRATION think ASD
    - [My notes are not divines: ASD has *fixed* split S2 meaning the split does not widen in inhalation or exhalation, its constant.]
    - ASD commonly caused by secundum defect, but in kids with Downs syndrome its cause of primal defect

- Pt has loud P2, what does that indicate? **Pulmonary Hypertension**

- What is going on if A2 is occurring *after* P2?
  - Paradoxical splitting, splitting is occurring only in exhalation. That's weird, why is that?
    - Occurs in any instance that slows down left ventricle, like LBBB, or really bad aortic stenosis

- Q: Patient has syncopal episode while playing sports, he had an uncle die at 35, what is the diagnosis? **Hypertrophic Obstructive Cardiomyopathy**, a genetic disease, has autosomal dominant inheritance
  - Caused by mutations in myosin binding protein C and B
  - Heard best at left lower sternal border
  - It's a systolic ejection murmur that does NOT radiate to carotids (unlike AS which does)
  - *Bifid pulse* seen in HOCM pts
  - What makes it louder? In HOCM there is *systolic anterior motion of mitral valve leaflet* (imagine what's going on here anatomically) this motion causes obstruction, as well as regurgitation. So blood not only has to go through thickened septum, but also through the mitral valve leaflet that is being pulled forward in systole. This is what causes the bifid pulse.
    - So if you move this mitral valve leaflet out of the way the symptoms wouldn't be as bad and the murmur would be less loud

        - This can be done by increasing amount of blood in left ventricle (anything that increases preload squatting etc)(Also anything that increases afterload like handgrip)
    - *Treat* via **B blockers**, which cause heart to slow down, allowing it to fill more in diastole, the increased volume in the left ventricle will then decrease the bad movement of the mitral valve leaflet
    - Increasing Preload (squatting) make murmur LESS intense

- **Aortic Dissection** is caused by cystic medial degeneration (buzzword)
    - Tertiary Syphilis, Marfans, Ehlers Danlos pts can all get AD

- **Carcinoid Syndrome**
    - Can have tricuspid insufficiency, pulmonic stenosis (TIPS mnemonic)
    - Also Be FDR mnemonic, ie bronchospasm flushing diarrhea right sided heart problems

- IV Drug users who inject drugs into their VEINS, what valve will be affected? **Tricuspid**

- What Murmurs do you investigate?
    - If systolic and equal or louder than Grade III (ie louder then s1s2)
    - ANY Diastolic murmur no matter how loud
    - Any symptomatic murmur
    - Holosystolic also investigated on NBME exams
    - In peds world, if musical qualities to murmur dont worry thats benign you don't need to investigate it

- Life Advice: Keep calm, step back, think what you can solve, what is out of your control don't worry about it :) don't worry, God loves you :)
- God Bless :)

CROSS CHECKED? Yes!

Ep 245: (Rapid Review Series 39)

Pt. with severe pain on finger mcp dip knee or something. Red erythematous -> septic arthritis

- NBS : Arthrocentesis
    - WBC count > 50k
    - Need a washout
    - What bug? -> Staph aureus
        - How to treat? Vancomycin
- Sickle cell? - > Salmonella

Same as above plus Petechiae on skin -> gonococcal septic arthritis. Tx: ceftriaxone or cefotaxime

- If negative gram stain or not sure, can give both vanc and ceftriaxone
- How differentiate between septic arthritis and osteomyelitis?
  - Septic: pain over a **joint**
  - Osteo: tender over a **bone**

Cervical ca screening: 21-29 pap q3 yrs, don't start before 21 even if sexually active.

- 30 yo, continue Paps but preferred to do **q5yrs with HPV co-testing**
- Immunocomp (HIV, immunodeficiency like DiGeorge, history of high-risk lesions): Paps **annually**
- In utero DES: Paps **annually**
- Hysterectomy for benign reason: can stop Paps
- If Hysterectomy due to endometrial ca or hyperplasia: need **Paps of vaginal cuff**
  - Usually stop screening at 65 if no history of abnormal findings for last 3 Paps or last 10 years if co-testing,
    - unless history of CIN or cervical lesion resected then need Paps for 20 year period after lesion resected
    - Remember: **conizations** increase risk of cervical insufficiency

Pt that has 2-PPD **smoking** history for 5 years, in past 3 weeks has **severe HA** and face appears "**bulging**" and have neck pain and **veins appear distended ->** SVC syndrome

- Cannot do chemo for symptom relief, instead must radiate lesion (Tx of choice)
- Assoc with Small cell lung cancer

Pt with Family hx of pancreatitis, presenting with epigastric pain to back but no hx of alcohol or just socially, no hx of gallstones -> familial hypertriglyceridemia

- Type 4 familial dyslipidemia: **AD** pattern
- Tx: give fibrate (gemfibrozil), better than statins to lower TG
  - MOA: activate PPAR-alpha (transcription factor to make more LPL to help clear out TGs)
  - Side effects: **myopathy, hepatotoxic, increase risk of gallstones**

Pt with DM and HFrEF, do **not** give thioglitazones

- PPAR-gamma activator ***different from above!***
  - (PPAR-gamma receptor also in kidney so increase water absorption and increase volume retention and worsens HF)

Pt with 2 weeks hx of **gen edema**, UA **with 4+ proteinuria**, then pt complaints of **chest pain**, SOB and super tachy, CT angiography shows **filling defect** think membranous nephropathy

- MOA?
  - Acquired deficiency of clotting inhibitor

- ATIII peed out in urine, cannot inhibit factor X or factor II so then these go make clots in body and cause **renal vein thrombosis** (sudden onset severe flank pain, hematuria) or PE
- Membranous Nephropathy: Ab against phospholipase A2-receptor
    - Also assoc with solid organ cancers (colon, etc.) and SLE
    - If lupus and **nephritic** diffuse membranoproliferative GN

Pt is a 32 yo female sex active with HTN -> OCPs

- MCC HTN in reproductive age females

If given scenario of PaO2 saturations of various areas around heart, example – SVC PaO2 sat 70% and right atrium sat 71% but right ventricle sats 80% and pulm artery is 81% think of blood from left side of heart is mixing with right side of heart which increases oxygenation

- Think ASD or VSD: ask where have biggest jump in saturation?
    - If SVC to RA: ASD
    - If RA to RV: VSD

Ep 246: (Derm Part 2 of 3)

Pt. is a 31 y/o male who is active military who came back from Afghanistan (Iraq, Saudi Arabia, Peru etc.) 2 to 3 weeks ago. On his arm (or anywhere typically on upper extremities) there is a painless, purplish ulcerating papule.

- Dx
    - Leishmaniasis
        - Transmission
            - Sandfly
        - How to diagnose?
            - Skin Biopsy
        - Treatment
            - Amphotericin B or Paromomycin

Pt is 50 or older there is a recombinant zoster vaccine

- NOT live attenuated.
- Can start administer 50 y/o
    - Eligible
- Reduce risk of post-herpetic neuralgia
- Reduce incidence of zoster

Pt is over 60 y/o there is a live-attenuated zoster vaccine

- live -attenuated given to those over 60
- Immunocompetent
    - If has HIV or CLL or immunodeficiency, do NOT give a live-attenuated vaccine

Typical vignette for zoster: pain, rash dermatomal distribution.

- But, if patient has a “zoster explosion” in body
    - NBS: Screen for HIV

Pt has a sudden outbreak of molluscum contagiosum

- NBS: Screen for HIV

Pt has porphyria cutanea tarda

- NBS: Screen for Hep C

Pt. with zoster with vesicular rash spread in dermatomal distribution on first branch of trigeminal nerve, tip of nose and eye (Opthalmic branch)

- Refer to ophthalmologist
    - Zoster ophthalmicus

Pt has vesicles in the ear and anterior sensation of taste of ⅔ tongue gone. Paralyzed upper and lower part on one side of face (like bell’s palsy) in the Cranial 7 pattern.

- Ramsay Hunt Syndrome (herpes zoster oticus)
    - Treatment
        - Acyclovir

Post-herpetic neuralgia

- Treatment
    - Gabapentin
    - nortriptyline, amitriptyline (be careful in elderly)

Do not give steroids in herpes zoster!!

Pt is a young kid, homeless who comes with referral. Itchy rash between finger webs, penis, scrotum.

- Dx
    - Scabies (sarcoptes scabies)
    - How?
        - Mite burrows in the upper layer of skin
    - Disseminated scabies
        - HIV, immunocompromised
    - How to diagnose?

        - Swab tissue and find mites and eggs on KOH prep
    - Treatment
        - Permethrin (also family members)
        - Ivermectin
        - Wash everything in hot water
        - DO NOT pick Lindane lotion
            - Neurotoxic, induces seizures in children

Pt. with an itchy lesion in skin. On exams, grouped papules that are very itchy. “Breakfast lunch and dinner lesions” Red circles in very close approximation. Usually in the morning.

- No real treatment (do antihistamines topical steroid etc)

Pt. with a history of HIV with brown lesions that look like a tan. Well demarcated plaques, papules with a “Stuck-on” appearance

- Dx
    - Seborrheic keratosis
- What to do with it?
    - Excision
    - Liquid nitrogen

Pt with sudden onset with tons and tons of stuck on appearances. What to screen for?

- GI malignancy (colonoscopy, EGD etc etc)

17 yo female not sexually active. Has warts. Flesh colored papules. Genital warts. Those are the things known as?

- Condyloma acuminatum [Do not confuse with Condyloma latum (syphilis) - do not confuse!]
- Treatment
    - Topical salicylic acid (works for acne)
    - Cryotherapy
    - Podophyllin
- Most likely sequelae?
    - Spontaneous resolution

- Red lesion on sun exposed spots (Face, back) lesions with “rough sandpaper appearance/ texture; bad rough spot”
    - What is it?
        - Actinic keratosis
            - Precursor to?
                - Squamous cell carcinoma
            - Treatment
                - Topical agent (5-FU)
                - Imiquimod

- Biggest RF for skin cancer -> sun exposure
    - UV-A vs. UV-B light
        - UVB light is worse
            - Thymidine-thymidine dimers form

- Primary preventive strategy for skin cancer?
    - Use clothes that will protect you from the sun
        - Pick sunscreen if there is no answer choice that gives you sun protective clothing or sun avoidance

- Pt was rescued from a fire. Has healed over time with plastic surgery. On his scalp there are lesions that haven't resolved. Have been slowly evolving.
    - Dx
        - Squamous cell cancer (usually bottom lip, but you can get it anywhere - like the scalp, ear, and neck)

- Pt has a red nodule that has continued quickly growing over time, and looks like a volcano. Contains a lot of keratin, debris at the center. Looks like it's going to erupt.
    - Dx
        - Keratoacanthoma
    - Treatment
        - Excision of lesion
    - Keratin indicates what?
        - Squamous malignancy

- Pink pearly, translucent lesions with telangiectasias on upper lip
    - Dx
        - Basal cell carcinoma
    - Spread?
        - Likes to spread horizontally
        - Very rapidly destructive
    - Treatment
        - Resection
        - Sometimes Mohs surgery (same as micrograph surgery)

- Pt with a lesion on skin with many different colors (black, brown), which is not round or oval, more irregular borders
    - Dx
        - Melanoma
            - Criteria
                - Asymmetry
                - Borders - irregular

            - Color variation (brown, red, black, blue)
            - Diameter - > 6mm we get worried
            - Evolution - changing over time

- Pt with a history of dysplastic nevus.
    - Risk factor for melanoma
    - Looks a lot like melanoma.
        - Dysplasia leads to cancer

- Pt with a family history of melanoma. With a ton of dysplastic nevi.
    - Dx
        - Familial melanoma dysplastic syndrome
            - Inheritance
                - Autosomal Dominant

- Melanoma
    - Different types
        - Nodular
            - Worse prognosis
        - Acral lentiginous
            - African american with melanoma under nail bed
            - Not as bad prognosis as nodular
        - Lentigo maligna
            - Pt has a melanoma that is on the face, upper-trunk, prominently exposed to sun
        - Superficial spreading melanoma
            - Best prognosis
            - Shows up on back in men. Legs in women.
            - Good prognosis
    - Treatment
        - Complete excision
        - More than 1 mm thick, send a sentinel lymph node biopsy
        - Prognosis
            - Breslow depth/thickness

- Pt sat on couch and has been itching with wheeling of skin
    - Treatment
        - Antihistamine

- Pt with angioedema do NOT have hives!

- What is the most common medication that people report an allergy to?

    - Penicillin
        - If they try to test patient on allergy
            - Do skin testing (not RAS(?) or ELIZA test)
        - Pt with anaphylaxis?
            - Anti-staph, cephalosporins should be avoided

- Pt. is a 6 y/o male with lyme disease. Given doxycycline (or adult that gets treated for syphilis, lyme disease) develops fever, headache, myalgia, malaise, sweating, headache, hypotensive
    - Dx
        - Jarisch-Herxheimer reaction
            - Treponema pallidum or borrelia etc. when you treat spirochetes they will explode and release endotoxins (penicillins are cell wall inhibitors)
            - Resolves quickly
            - Supportive care
            - Continue antibiotic
            - Not an allergic reaction

- Pt recently took TMP-SMX for cystitis. Last two days the patient has an edematous face. Generalized skin reaction. Person AST/ALT and eosinophil elevated, elev. Lymphocytes and generalized lymphadenopathy
    - Dx
        - Hypersensitivity syndrome (Type IV)
        - Dress Syndrome (same thing)
        - Treatment
            - IVIG

Ep 247: (Rapid Review Series 40)

Pt is a 51 y/o fEMA with right sided headache for the past four days with diffuse muscle aches and pain. On labs ESR and CK are both elevated.

- Dx: Temporal arteritis
- Associ: proximal muscle tenderness (polymyalgia rheumatica), jaw claudication
- NBS: High Dose Corticosteroid Therapy (eventually you biopsy)

Pt is a 27 y/o m with hx. of multiple suicide attempts. Over the last 24 hours his close acquaintances have noticed he has had bloody bowel movements, hemoptysis with nasal bleeds and abdominal pain.

- Most likely ingestion? Rat poison
- Why? Rat poison contains warfarin.
- MOA? Inhibit Vit K epoxide reductase (Protein C, S and Factors 2, 7, 9, 10)

Pt is a 22 y/o Male with 6 months of trouble breathing and low back pain. On PFT, noticed to have a restrictive pattern of lung disease.

- Dx: Ankylosing Spondylitis
- Why? They have spinal problems. Can cause restricted expansion of the lungs. Cavity is kind of contorted.

What is the lung problem? Will have restrictive lung disease with normal DLCO.

Pts are a couple of gardeners. Over the last 12 hours they've had diffuse muscle weakness, blurry vision, ptosis on a fundoscopic exam. Been having constipation, feeling very hot, hyperthermic.

- Dx: Botulism
- MOA: can't release ACH at neuromuscular junction

Pt. is a 23 y/o male that is sexually active. Over the last 3-4 weeks flesh colored growths on genitals.

- Dx: Condyloma acuminatum
- Cause? HPV 6,11 (NOT 1,6 which cause plantar warts) (16, 18 cause cervical cancer)
- Tx: Podophyllin (topical agent)

Pt is a 27 y/o male with hx of DMT1. Over the past 2 days has had a severe headache. Bilateral babinski sign. Neurodeficits. Glucose at 700. Bicarb at 10. pH at 7.16. On imaging has ring-enhancing lesion in brain.

- DX: Diabetic Ketoacidosis
- Bug? Mucormycosis

Pt is a 62 y/o female presents with pain in her mid-back over the last three days. T 98.6, P:70bpm, RR14. PE is unremarkable other than tenderness in the mid thoracic spine.

Labs normal except for Alkaline Phosphatase, which is elevated.

- Dx: Osteoporosis (compression fracture)
- Common location: vertebral location or hip.
- Why does this happen? post-menopausal women don't make as much estrogen. Decrease osteoprotegerin. RANKL and RANK receptor interactions cause more activation of Osteoclasts. Increased osteoclast activity! Gives rise to resorption of bone.

Pt that recently bought a used dehumidifier at an antique store int he past 2-3 weeks. Pt. has had SOB, diarrhea, high fevers with Plt count at 30,000 and Sodium at 127.

- Dx: Legionella
- NBS: Urine antigen test

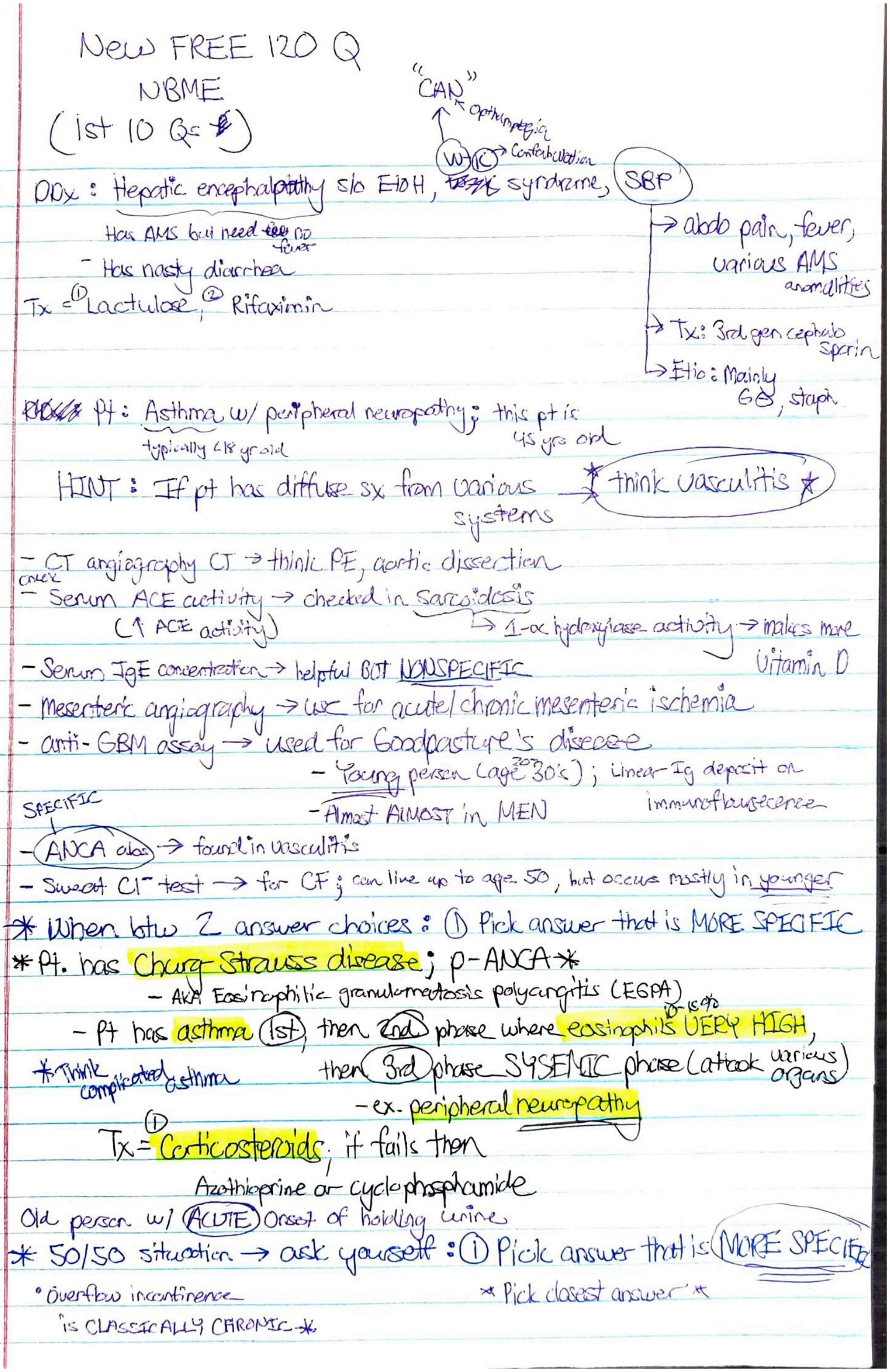
- Tx: Macrolides
- MOA of hyponatremia: thinking about interstitial nephritis. Acute Kidney Injury. Can't excrete potassium correctly. May have hyperkalemia. Like dialysis patients who miss their dialysis appointment. High potassium.
- Stain: Silver-stain (pcp is also silver stain, think HIV, tx with TMP-SMX)

Pt. that has had bad epigastric pain that is worsened by meals.
- Dx: H. Pylori (silver stain + staining organism)

Pt is a weight-lifter who over the last two weeks with numbness, weakness in right hand, forearm with barely perceptible radial and ulnar pulse.
- Dx: thoracic outlet syndrome
- MOA: (super hypertrophied muscles cause they're super fit. Compress subclavian or brachial plexus injury. Almost claudication of extremity)

Pt. is a 71 y/o male who over the last three hours has had chest pain radiating to jaw. On way to hospital patient deceases.
- Dx: Arrhythmia (think VFIB)

Ep 248: [New Free 120 Q1-10 (2020)]



New FREE 120 Q
NBME
(1st 10 Qs)

"CAN"
↑ ← opthalmoplegia
W (C) → Confabulation

#1 • DDx : Hepatic encephalopathy s/o EtOH, [illegible] W(C) syndrome, SBP

- Has AMS but need ~~fee~~ no fever
- Has nasty diarrhea

Tx = ① Lactulose, ② Rifaximin

SBP
→ abdo pain, fever, various AMS anomalities
→ Tx: 3rd gen cephalosporin
→ Etio: Mainly G⊖, staph

#2 • [illegible] Pt: Asthma w/ peripheral neuropathy; this pt is 45 yrs old
(Asthma: typically <18 yr old)

HINT: If pt has diffuse sx from various systems → ★ think vasculitis ★

- CT angiography CT → think PE, aortic dissection
- Serum ACE activity → checked in sarcoidosis (↑ ACE activity)
  - sarcoidosis ↳ 1-α hydroxylase activity → makes more Vitamin D
- Serum IgE concentration → helpful BUT NONSPECIFIC
- Mesenteric angiography → use for acute/chronic mesenteric ischemia
- anti-GBM assay → used for Goodpasture's disease
  - Young person (age 20's 30's); Linear-Ig deposit on immunoflourescence
  - ~~Almost~~ ALMOST in MEN
- ANCA abs → found in vasculitis (SPECIFIC)
- Sweat Cl⁻ test → for CF; can live up to age 50, but occurs mostly in younger

* When btw 2 answer choices: ① Pick answer that is MORE SPECIFIC

* Pt. has Churg-Strauss disease; p-ANCA *
- AKA Eosinophilic granulomatosis polyangitis (EGPA)
- Pt has asthma (1st), then (2nd) phase where eosinophils VERY HIGH (10-15%), then (3rd) phase SYSEMIC phase (attack various organs)
  - ex. peripheral neuropathy

*Think complicated asthma

Tx = ① Corticosteroids, if fails then Azathioprine or cyclophosphamide

#3 • Old person w/ (ACUTE) Onset of holding urine

* 50/50 situation → ask yourself: ① Pick answer that is MORE SPECIFIC

* Pick closest answer *

- Overflow incontinence is CLASSICALLY CHRONIC *

#4 • MCC of hyperthyroidism → Graves disease

- Leukocyte count is LOW
  - Agranulocytosis

• Methimazole drug problem
Next step? A = Stop the drug and do broad spectrum Abx to cover pseudomonas

#5 • Spleen removed → no protection against infection → do Abx

- Again, PICK MOST SPECIFIC ANSWER!!!

#6 • Neiserria meningitis

- Hand washing → Helps to prevent getting C. difficile or Rotavirus
- ~~[illegible]~~

* When you see an NBME answer that's a ~~[illegible]~~ copacet / seems unreasonable BUT technically effective → DO NOT SELECT IT!

50/50 scenario: MAKE SURE YOU CHOOSE AN ANSWER that answers the Question being poised

*This long question stem is emphazing about community spread

- Here: Asking about PREVENTION!!!
- Acutally, it is the wisdom tooth extraction 2 days ago that is causing the fever / this pt's chief ~~complaint~~ complaint

* TIP = What is the question asking specifically? I.e., what is the question topic or educational objective it is asking?*

- THIS is a PREVENTATIVE medicine question!!!
  - ex. "She cannot remember her vaccination Hx."

#7 • Just a knowledge question here!

- KNOW: Every pregnant woman needs to be screened for HIV!

#8 • You cannot force a pt/participant to do something; they have right to withdraw voluntary, even after consent was given prior in this scenario!

#9 • Just think big picture here!

OLD guy w/ urinary problems comes to clinic → Hint meaning pt is NOT that sick!

suggestive of BPH

If this pt has BPH, then best choice among answer choices is measurement of postvoid residual volume

* Renal biopsy → indicated in a pt w/ a kidney disorder but unsure what's going on
→ ex. lupus nephritis, nephrotic/nephritic syndromes

#10 • Remember: A Gram stain with NO organisms DOES NOT rule out infection!

Dx: Septic arthritis
- Next step: Abx (i.e. Vancomycin)

MCC of septic arthritis is Staph aureus.

Ep 249: (Blood Oxygen Content and the USMLEs)

- Formula for Oxygen content of blood
  - 1.34(mL) x Hemoglobin x SaO2
    - SaO2
      - How much of Hgb is saturated with oxygen
    - paO2
      - Amount of oxygen dissolved in plasma
      - Does **NOT** involve any oxygen attached to hemoglobin
    - pAO2
      - Amount of oxygen entering alveoli
- Pt. goes to higher elevation?
  - Amount of oxygen in the atmosphere?
    - Less oxygen present.
    - Oxygen tension goes down
    - Less atmospheric pressure
  - Proportion of oxygen at atmosphere
    - Remains the same (21%)
    - Same percent.
  - MOA of low paO2?
    - O2 goes to alveoli diffuses capillaries membranes and becomes paO2. The O2 dissolved in plasma saturates Hb with Oxygen.
    - Dec. pAO2 leads to paO2 and leads to SaO2.
      - A chain reaction
  - Low pAO2 leads to low paO2 leads to SaO2.
    - Think about NBME arrow questions.
- SaO2
  - Percent of hemoglobin saturated with oxygen
  - If paO2 then your SaO2 is also low.
  - What affects SaO2?
    - Heme contains iron
    - Oxidation # of iron
      - Fe 2+
        - Ferrous iron
      - Fe 3+
        - Ferric iron
        - No ability to bind oxygen (already maximally oxidized)
        - Heme with iron at 3+?
          - Methemoglobin
          - How to measure?
            - Pulse oximeter
- Pt. with headache and history of (car exhaust, space heater, house fire, uses a stove). Blood has a cherry red color.

  - Dx: carbon monoxide (CO) poison
  - Primary site of action of CO?
    - Hemoglobin (Doesn't do much in blood)
    - PAO2 and PaO2 is normal, but SaO2 will be decreased.
    - Shift on the oxyhemoglobin curve?
      - Left-shift
  - How to treat poisoning?
    - 100% hyperbaric oxygen
  - Pt. with chronic exposure to CO with cogwheel rigidity etc with most common etiology?
    - Necrosis of the Globus pallidus
      - Imaging?
        - Hyper-intensity of Globus Pallidus
- Pt took nitrate for angina, or sulfa drug (TMP-SMX) - PCP prophylaxis, TMP-SMX for toxo prophylaxis. Appears cyanotic. And blood appears “Chocolate color”
  - Dx: methemoglobin
    - Iron at 3+ = ferric form
      - No ability to bind oxygen anymore
      - Pathophys? Fe2+ in Hgb is converted to Fe3+. O2 can’t bind to Fe3+
    - SaO2 is decreased.
  - Don’t expect to see headache
  - Tx:
    - Methylene blue
      - Enzyme methemoglobin reductase. Converts Fe3+ to Fe2+
    - Vitamin C
- When do we **induce methemoglobinemia**?
  - To treat cyanide poisoning
    - Cyanide inhibits ETC
      - Complex IV
        - Prevents ETC from being functional
    - Depend more on anaerobic metabolism
      - Increase conc. Of lactic acid.
    - Give Amyl Nitrate
      - Fe 2+ -> 3+
        - Thiosulfate
          - Thiocyanate
            - Pee / poop out to excrete cyanide
    - Give hydroxocobalamin (B12)
      - Combines with Cyanide and becomes safely excreted from the body
- Recap: Don’t confuse Carbon Monoxide, Methemoglobinemia, and Cyanide Poisoning

- Pt who is anemic. Are they hypoxemic?
  - Yes
  - When pt. has anemia there’s no problem with lungs, therefore:
    - PAO2 is fine
  - When pt has anemia there’s no problem with blood vessels, therefore:

  - PaO2 is fine
- When pt has anemia there is no problem with saturation, therefore:
  - SaO2 is fine
- Anemic patients have decreased hemoglobin
  - Decreased buses for oxygen
  - Decreased oxygen content is due to decreased Hemoglobin
- When oxygen content decreases in blood what happens to the heart?
  - To maintain more oxygenation heart increases cardiac output
    - Heart eventually craps out. Can’t work at an elevated rate forever.
  - Leads to HIGH OUTPUT HEART FAILURE
    - Mechanism of hydrops fetalis
      - Rh incompatibility.
      - Baby develops profound anemia.
        - Heart tries to keep up with increased Cardiac output
        - Baby develops heart failure, which leads to edema if heart stops working.
    - Mechanism of Parvo
      - Parvo torches RBC precursors
        - Can’t produce RBC.
        - Develop anemia.
          - May lead to high output cardiac failure
  - High output cardiac failure
    - Speed of blood in vessels is elevated.
    - Preggo with Rh antibodies and the baby is at risk. NBS?
      - Measure the velocity of MCA via Ultrasound.
      - Increased velocity = surrogate for anemia
        - Blood less viscous (less hemoglobin)
- Diffusibility of gas
  - Diffusibility of gas is related to the area available of diffusion divided by thickness of membrane.
  - Direct relation with spread of pressures between Point A to Point B
  - Diffusibility of gas is proportional to area available for gas diffusion and inversely proportional to thickness available for diffusion.
  - Pt with emphysema
    - Has proteases that have chewed up alveolar surface area/parenchyme
      - Pt has decreased surface area then there's reduced diffusibility of gas, therefore:
        - There’s hypoxemia with increased A-a gradient
          - PAO2 can’t match PaO2
            - No alveolar membrane
            - Decreased area of diffusion which leads to hypoxemia
  - Pt with pulmonary fibrosis
    - (Ankylosis?)
    - Increased thickness of alveolar membrane

            - Inverse relationship means less diffusibility of gas
            - Distance between PAO2 and paO2 is larger.
    - Systemic scleroderma
        - Pulmonary hypertension
            - Pt has interstitial lung disease
                - Pulmonary fibrosis
                    - Increased thickening
    - Pt with UTI who takes nitrofurantoin and pt develops chronic hypoxia?
        - Nitrofurantoin induced pulmonary fibrosis
    - Pt with Rheumatoid arthritis and pt develops chronic hypoxia?
        - Methotrexate induced pulmonary fibrosis
    - Pt on chemo and develops chronic hypoxia
        - Bleomycin or Busulfan
    - Pt with chronic rhythm control for AFIB develops chronic hypoxia
        - Amiodarone

Ep 250: [HY Vaccine]

- Two big types of vaccines
    - Live attenuated
        - Bug that has been severely weakened, but retains ability to infect cells.
        - Generates a T-Cell response
        - No real need to give boosters
        - Ex
            - MMR
            - Varicella
            - Intranasal influenza vaccine
    - Killed/Inactivated vaccine
        - Destroyed bug but you keep antigenic parts, which generates a response from immune system
        - Generates Humoral response
        - Need to give boosters
    - Toxoid vaccine
        - Toxin from bug that can act on receptors in the body to generate antibody response
- Pt is a newborn with a mom that has HepB surface antigens +
    - NBS
        - HepB vaccine AND HepB immunoglobulin
            - Administered In opposite extremities

- Rotavirus vaccine is live attenuated (with a twist)
    - Live attenuated are not usually given to those < 1y/o
        - Rule does NOT apply to newborns.
        - Kids receive a vaccine at 2,4,6 months.
- Child that receives rotavirus vaccine. Which of the following is the most dangerous complication?
    - Intussusception
        - If pt has had it in the past intuss
        - Hx of meckel's
        - IgA nephropathy (or HSP)
- What do these vaccines have in common: TDAP, HepB or PCV-13, polio, HepA, neisseria meningitidis?
    - Inactivated
- Two types of influenza
    - Inactivated
        - Intramuscular
    - Live-attenuated
        - Intranasal. Inhaled as mist
- PCV-13 and PPSV-23
    - P**C**V-13
        - **C**onjugated. Pneumococcal "C"onjugated
            - B + T cell response
    - PPSV 23
        - Polysaccharide
            - Humoral response (No T cells)
    - PCV 13 always taken FIRST before 23
        - Mnemonic aid: 13 comes before 23.
    - PCV13 is taken by everybody!
    - PPSV 23
        - Given for those > 65 y/o
        - Those under 65 y/o that should have vaccine include (think of organs with chronic disease):
            - Smoker
            - Diabetes
            - Cochlear implant
                - Older person on test.
                - Alport syndrome
            - Chronic CSF Leak
            - Immunodeficiency (HIV, Bruton, SCID, CVID)
            - Those with no spleen

- Who does not get live attenuated vaccines?
    - Pregnant women
    - < 1 y/o (exception: rotavirus)
    - CD <200 (immunodeficiency)
- Vaccines in kids
    - Approximate rule but works a lot:
        - Most pediatric patients are at least 3 doses
            - But not always true
        - Most are given at 2, 4, 6 months of age.
            - Those that don't follow this rule?
                - Live attenuated vaccines!
    - Hep B vaccine
        - Need to get it before you leave the hospital.
        - Three doses
            - First dose at birth
            - Second dose: within 2 months of birth
            - Third dose is between 6-18 months of age
    - Rotavirus vaccine obeys second rule
        - 3 doses vaccines given at 2,4, and 6 months.
    - DTap vaccine
        - 5 doses with extra information to know.
            - 3 doses at 2, 4, and 6 months
            - 4rth dose: ~ 15-18 months of age
            - 5th dose: 4-6 y/o
        - When you're older:
            - TDap (Adolescent
            - TD booster
    - H. Flu Type B vaccine
        - 3 doses
            - 1st dose: 2 months
            - 2nd dose: 4 months
            - 3rd dose: 12-15 months
    - PCV-13 vaccine
        - 4 doses
            - 1st dose: 2 months
            - 2nd dose: 4 months
            - 3rd dose: 6 months
            - 4rth dose: 12 - 15 months
    - Polio vaccine
        - Four doses

    - 1st dose: 2 months
    - 2nd dose: 4 months
    - 3rd dose: 6 months
    - 4rth dose: 4-6 y/o
- Influenza vaccine
  - Every year.
  - Less than a year old do NOT give intranasal.
- Specialized live-attenuated
  - MMR and varicella
  - Group both together with the same vaccine schedule.
  - Two doses
    - 1st dose: 12-15 months
    - 2nd dose: 4-6 y/o
- Hep A vaccine
  - Two doses
    - 1st dose within 2 y/o
    - 2nd dose: 6 months after 1st dose
  - Later given in adolescence
- 10-18 y/o
  - Meningococcal vaccine
    - Two doses
      - First dose: 11-12 y/o
      - Second dose: 16 y/o
- HPV vaccine
  - Can give starting from 9-26 y/o
- Zoster vaccine
  - Not the same as varicella
  - Get zoster at age of 50
    - Two doses (6 months apart)
- Pregnancy
  - Women supposed to get TDAP vaccine
    - Within 27-36 weeks
- Pt splenectomy (Sickle cell, trauma)
  - PCV-13 and PPSV-23, strep pneumo, H flu, and neisseria meningitidis
- Timeline between PCV-13 and PPSV-23
  - Wait between two months between both vaccines
- Pt. has sickle cell/splenectomy in addition to above those patients need
  - Amoxicillin or penicillin until they reach the age of 5.
- Egg allergy
  - Avoid Yellow fever (Everything else is fine, yes - even MMR!!)

Ep 251: [The HY Thyroid Podcast]

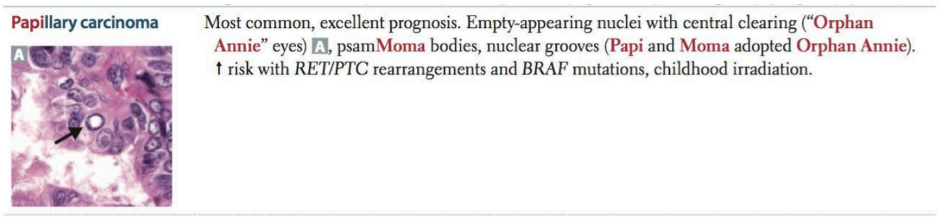
- Embryo
  - Thyroid comes from base of tongue
    - Foramen cecum (Endoderm)
      - Thyroglossal duct props down from that
- Pt with a neck mass at midline that moves with swallowing?
  - Dx?
    - **Thyroglossal duct cyst**
    - If nbme is like “they have a neck mass and it is lateral to midline, does not move with swallowing” think **branchial cleft cyst**, not thyroglossal duct cyst!
      - Branchial cleft cysts are *lateral*, *don't* move with swallowing, derived from pharyngeal ectodermal grooves/clefts
      - Thyroglossal duct cysts are midline, move with swallowing, derived from endoderm
- Pt notices a lump on the neck when putting on tie, next best step?
  - Nbme likely describing thyroid nodule, best step is *get TSH Level*
    - If TSH is low, there must be some hyperthyroid going on, so it's a “hot” nodule
      - If “hot” nodule, get RAIU scan
        - If global uptake in ENTIRE thyroid it’s Graves disease
          - Graves is the number one cause of hyperthyroid disease
          - To treat give Methimazole/PTU or radioactive thyroid
          - Don't pick thyroidectomy that's usually wrong answer
        - If RAIU shows *one* hot spot, thats **toxic adenoma**
          - Why is there only one hotspot and why isn't the whole thyroid lit up?
          - Well cause there's one small group of cells secreting T3/T4, which goes on to suppress TSH, hence other areas of thyroid aren't stimulated
        - If *multiple* hot spots? **Toxic multinodular goiter**
    - If TSH is anything besides low (ie normal or high) it is a “cold” nodule
      - If cold nodule next best step is **US** then **FNA**
      - 75% most people with cold nodules just have colloid cysts which are nothing to worry about, but 20% could have thyroid cancer, only way to tell is biopsy
    -
- PT gets CT for some reason and CT says they have no thyroid but they feel fine and TSH and thyroid levels normal, what's going on?
  - **Lingual thyroid**
    - Remember migration pattern of embryology for this

    - Most common location of ectopic thyroid is the tongue

- You see a newborn with hypothyroidism, what is the most common cause of this?
  - **Thyroid dysgenesis** (ie where thyroid doesn't properly form)
  - Baby will have large tongue, umbilical hernia
  - Side note: PTU/Methimazole in mom can suppress babies thyroid (they are teratogenic afterall and cause aplasia cutis), don't freak out when you see these babies hypothyorid levels, just chill for a few days and repeat exams and labs later, they'll be fine once those drugs are out of their system

- PT is hypertyroid but RAIU shows no uptake at all, they recently had an URI and their thyroid is tender, diagnosis?
  - **Subacute Thyroiditis** (also called **De Quervains** thyroiditis or granulomatous thyroiditis, so it has multiple names to confuse you lol)
  - How to differentiate between De Quervains and a person who is taking exogenous thyroid factiously (i.e. like a person trying to lose weight)?
    - So in DeQuervains there is a dump of thyroid hormone leading to suppressed TSH and hence cold RAIU
    - Likewise exogenous thyroid also suppresses TSH and leads to cold thyroid
    - The nbme won't be nice and say "hey they just had a URI and now their thyroid is tender" so how to tell the difference?
    - Use **Thyroglobulin** (kind of like using "c-peptide" in insulinoma), exogenous thyroid will not have thyroglobulin but pts with De Quervains will have it (ie increased levels of it i think)

- PT is hyperthyroid, RAIU is cold, they have adnexal mass also, diagnoses?
  - Struma Ovarii (makes thyroid hormone)

- PT has neck mass, biopsy reveals xys, what is the biggest Risk Factor for this condition?
  - Prior history of head or neck radiation!
    - Like they had hodgkins as a kid and got radiation, now have neck mass
    - Especially **Papillary**, which is the most common type of thyroid cancer,
      - Papillary = Psammoma bodies, orphan annie nuclei on histology
      - 

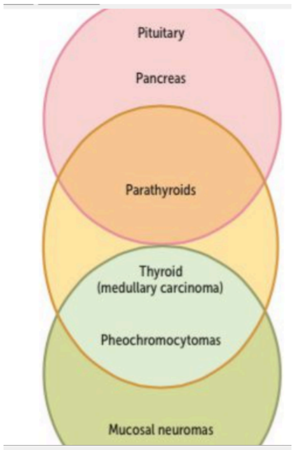
Papillary carcinoma

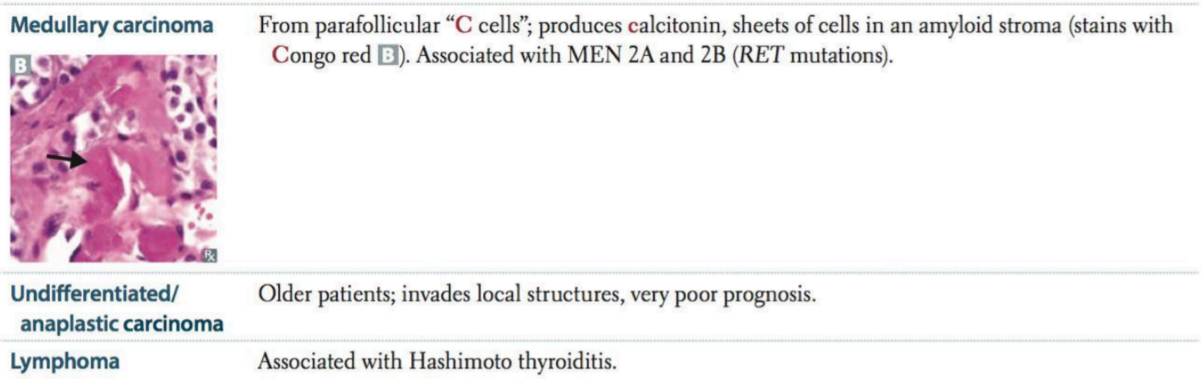
Most common, excellent prognosis. Empty-appearing nuclei with central clearing ("**Orphan Annie**" eyes) A, psam**Moma** bodies, nuclear grooves (**Papi** and **Moma** adopted **Orphan Annie**). ↑ risk with *RET/PTC* rearrangements and *BRAF* mutations, childhood irradiation.

- PT has Thyroid Cancer that metastasis to the brain, what type of thyroid cancer do they most likely have?
  - **Follicular** Thyroid Cancer as it spreads *hematogenously*!
    - Papillary spreads through lymphatic channels so less likely to go to brain then Follicular
    - (example like choriocarcinoma spreads hematogenously and goes everywhere quick)

        - Papillary thyroid cancer has great prognosis unlike follicular

- Is FNA enough to diagnose Follicular Thyroid Cancer?
    - Nope
    - FNA can't tell the difference between Follicular Adenoma and Follicular **C**arcinoma, so what is the next best step in diagnosis ?
        - Lobectomy, take out entire thyroid lobe to make sure

- Pt has neck mass, they are having seizures, calcium is like 6, ECG shows QT prolongation, they have had several family members die from neck masses, what's your diagnosis?
    - **MEN 2A** or **2B** leading to **Medullary thyroid cancer**
    - Medullary thyroid cancers tumor marker is **Calcitonin** (tones down Ca) hence symptoms
- Patient has MEN 2A or 2B what surgical procedure is indicated in these patients
    - prophylactic thyroidectomy, if you have MEN2A or 2B its not a matter if you'll get medullary thyroid cancer it is a matter of when
- Pt has thyroid cancer, it lights up on congo red staining, diagnosed?
    - Medullary Thyroid Cancer (derived from cancer of C cells)
    - 



Medullary carcinoma	From parafollicular "C cells"; produces calcitonin, sheets of cells in an amyloid stroma (stains with Congo red B). Associated with MEN 2A and 2B (*RET* mutations).
Undifferentiated/ anaplastic carcinoma	Older patients; invades local structures, very poor prognosis.
Lymphoma	Associated with Hashimoto thyroiditis.

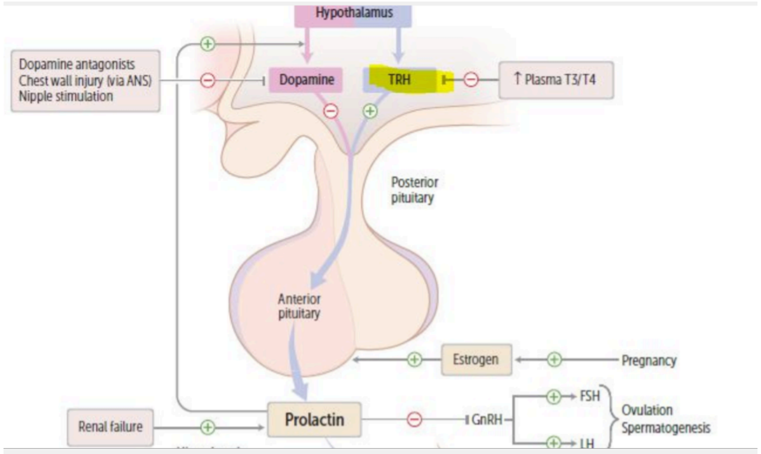
- Pt is like 70 (ie they're old, not like 30-40s) has widespread, firm neck, diagnoses?
    - Anaplastic thyroid cancer
    - Awful prognosis :(

- Pt is a 25 yo they're super sick, they've been in ICU, or they had bad sepsis, they're TSH is fine, T4 is fine, T3 is low, diagnoses?
    - **Euthyroid Sick Syndrome**
    - Whenever someone that is very sick think this
    - They'll have normal TSH, normal T4, decreased T3, and ***increased reverse T3 (HY*****)**
    - If patient is sick, losing a lot of weight, body needs to conserve energy, one way it does this is by decreasing metabolic rates, via decreasing thyroid level (T3)

- Most common cause of hypothyroid on any human (not newborn) you see on an NBME exam?
    - **Hashimotos**
        - T3 and T4 low, TSH is high
        - Usually question stem will give you history of some other autoimmune disease
        - What if PT with hx of Hasimotos has rapidly expanding neck mass, biopsy shows germinal follicles? Diagnoses?
            - **Thyroid Lymphoma**

- Pt has a history of Graves, they are decompensating, super hypertensive, super tachycardic, AMS, diagnoses?
    - **Thyroid Storm**
    - What's the *first* thing to give these PTs?
        - Beta Blocker (propranolol)
    - What's the second step?
        - Give PTU
    - Then what can you do?
        - Can give SSKI, which is super saturated potassium iodide, which takes advantage of the Wolff-Chaikoff effect which is the concept that giving a punch of iodine will transiently shut down thyroid hormone synthesis
    - Can also give steroids

- Signs of Hypothyroid
    - Low heart rate (seen in a lot of nbme exams)
    - Decreased fertility, because if hypothyroid, TRH will go up, which increases Prolactin, which decreases GnRH (sidenote antipsychotics ie dopamine blockers work through similar mechanism to decrease fertility)

    - 
Hypothalamus
Dopamine antagonists
Chest wall injury (via ANS)
Nipple stimulation
Dopamine
TRH
↑ Plasma T3/T4
Posterior pituitary
Anterior pituitary
Estrogen
Pregnancy
FSH
Ovulation
Spermatogenesis
Renal failure
Prolactin
GnRH
LH
    - God Bless, he loves you :)

Ep. 252 Post Exposure Prophylaxis and the NBMEs

- Post exposure prophylaxis
    - Immunoglobulins, vaccines etc to prevent...
- **Hepatitis B**
    - Pt is a newborn to a mom with HepBs+. What to give the baby?
        - Hep B Vaccine AND HepB Immunoglobulin
            - Should give given in separate arms.
    - Healthcare worker with needlestick exposure. Unsure of HepB vaccination?
        - Give HepB immunoglobulin and Hep B vaccine
    - Pt has been given a HepB vaccine in the past (and had an adequate antibody response) and becomes exposed now?
    - Do NOT give anything.
- **Hepatitis C**
    - Pt is Exposed to HepC?
        - Not a lot you can do.
        - Good thing is that are medications to help:
            - Sofosbuvir, NS-B inhibitors
- **Hepatitis A**
    - Pt is Exposed to HepA?
        - Never vaccinated?
            - HepA vaccine
    - Exposed to Hep A but the patient is immunocompromised (HIV, IgA deficiency, DiGeorge, Chediak-Higashi, CGD, etc)?
        - Hep A immunoglobulin AND vaccine
- **HIV**
    - Pt is exposed to HIV?
        - Two regimens (TE-LZ) both for about 4 weeks
            - T + E

                - Tenofovir
                    - AND
                - Emtricitabine
            - L + Z
                - Lamivudine
                    - AND
            - Zidovudine
- **Varicella Zoster**
    - Pt is exposed to VZV?
    - For example, newborn born to mom with active shingles, varicella infection etc?
        - Varicella Zoster immunoglobulin
            - CANNOT give vaccine (it's live
    - Pt is pregnant or HIV with CD < 200.
        - Varicella Zoster immunoglobulin
    - Pt is healthy?
        - Can give Varicella vaccine
- **Rabies**
    - Pt has been exposed to Rabies?
        - Rabies immunoglobulin + vaccine
    - Where do you give the rabies immunoglobulin?
        - Want to give AROUND the round
            - Infiltrated and bind toxin.
- **N. meningitidis**
    - Pt exposed to someone with N. meningitidis
        - Four options
            - Ciprofloxacin
            - Rifampin
                - Preferred
            - Ceftriaxone
            - Azithromycin
        - Pt is pregnant?
            - Ceftriaxone
            - Azithromycin
- **Pertussis**
    - Pt exposed to someone that has pertussis?
        - Macrolide
            - Clarithromycin
            - Erythromycin
        - If a patient has a long QT interval or person has ventricular arrhythmia history or macrolides aren't an option?
            - TMP-SMX
- **Tuberculosis**
    - Pt is exposed to someone with Tuberculosis?
        - Test person with TB Skin Test or Interferon Gamma Assay
        - Induration cutoff for someone with exposure?

            - 5mm or more
                - Give them latent TB regimen (INH for 9 months + Vitamin B6
                    - Pyridoxal phosphate given to prevent peripheral neuropathy
- **Tetanus**
    - Two groups of patients
        - Group A
            - Types of patients:
                - Unsure of hx of vaccines/ immunization status? or
                - Hx of last tetanus vaccine **more** than 10 years ago?
            - Treatment
                - Nasty wound?
                    - Tdap Vaccine + Tetanus Immunoglobulin
                - Small wound?
                    - Give Tdap vaccine only
        - Group B
            - Types of patients:
                - Tetanus vaccine **within** the last 5 years?
            - Treatment
                - **Do nothing!** (Regardless of type of wound)
- **Necrotizing fasciitis**
    - Exposed to necrotizing fasciitis?
        - Some kind of antibiotic
            - Azithromycin
            - Clindamycin
            - Rifampin + Penicillin
- **General topics**
    - Transmission
        - Rotavirus, C. diff (spores)
            - Improper handwashing
        - Staph Aureus gastroenteritis?
            - Did not refrigerate food properly

Ep. 255 Legendary Step 2CK/3 Pharmacology

- Blood drugs
    - antiplatelet/ anticoagulants
    - Anti-platelet
        - Who?
            - Stroke or carotid stenosis (TIA)
                - 1st line drug?
                    - Aspirin
                - 2nd drug
                    - Clopidogrel

        - 3rd drug
          - Dipyridamole
      - Peripheral Arterial disease
        - Aspirin for life
      - Percutaneous coronary intervention (MI)
        - Dual antiplatelet agents for a few months after the stent is placed
      - Acute MI / Chest pain
        - 1st line drug?
          - Aspirin
      - Kawasaki
        - Aspirin + IVIG
      - Preeclampsia in previous pregnancy and prevent in future pregnancy
        - Aspirin prophylaxis
- Woman with cervical insufficiency. How to prevent insufficiency in future pregnancy?
  - Progestin suppository
- Primary Hemostasis
  - Adhesion step
    - GP1B - VWF binding
      - Begin to eject ADP from platelet
        - ADP binds to ADP receptor (P2Y12)
          - GPCR triggers signaling cascade
  - Aggregation step
    - GpIIb/IIIa binds to other GpIIb/IIIa
  - Formation of platelet plug
- What does aspirin do?
  - Irreversible COX-1 and COX-2 inhibitor
    - Can’t make TXA2 (helps with platelet aggregation) so you can’t aggregate
- GpIIb/IIIa inhibitors
  - Abciximab, eptifinabie, terafibine
    - Prevent GpIIb/IIIa from binding to another GpIIb/IIIa can’t form platelet plug
- ADP receptor antagonists (P2Y12 receptor blockers)
  - clopidogrel ,
    - Block receptor ADP won’t bind to it and can’t activate the receptor.
- PD3 inhibitors
  - Cilostazol, dipyridamole
  - Increase cAMP
    - Increase cAMP in platelet INHIBIT signaling cascade downstream of p2y2 receptor
    - P2Y2 is inhibitory GPCR. less camp = more platelet activation. So if you inhibit PD3 leads to more cAMP and decreased platelet activation.
  - When cAMP is high it causes smooth muscle?
    - To Relax!
      - Vasodilation
  - Cilostazol and NBME?
    - Give *after* trying a supervised exercise program in patients with Peripheral Arterial Disease.

- Dipyridamole
    - Pharmacological stress test
    - Boosts levels of adenosine
        - Adenosine deaminase inhibitor
            - Causes vasodilation
        - Theophylline antagonizes Adenosine

    - ~12 mins
- Warfarin
    - Prosthetic Heart Valve indication
        - Target INR 2.5 - 3.5
        - INR 6 and 7
            - Stop the Warfarin, give oral vitamin K
            - Bleeding Out? Reverse with 4FPCC
            - Reverse Heparin with Protamine Sulfate
    - A. Fib from valvular cause i.e. MS cause
    - Risks
        - Don't give to pregnant woman
        - Duodenal hematoma (SBO), rectus sheath hematoma, intracranial bleed
        - Don't' give tPA with warfarin (they'll bleed out and die)

    - Inhibits Vitamin K Epoxide Reductase
        - Can't gamma carboxylate 2,7,9, 10, Protein C, S
        - Protein C and S are anticoagulation
        - 2,7,9,10 are coagulants

    - Bridge with Heparin First!
        - Activates antithrombin III
            - Can inhibit factors 10 and 2
        - Protein C and S have a shorter half life
            - Fall out of circulation first
            - 2,7,9,10 are left for temporary coagulation
            - So there is a temporary hypercoagulable state in patients with Warfarin, that's why they need that heparin bridge
        - Low Molecular Weight Heparin
            - Also activates antithrombin III BUT only inhibits Factor 10
- Factor 10 Inhibitors
    - All have Xa in their name
- Factor 2 inhibitors
    - Argatroban, Dabigatron, Bivalirudin
    - Pt. presentation
        - Platelets drop post giving heparin
            - Stop Heparin, don't give LMWH
            - Start them on Factor 2 inhibitors
            - Dabigatran is reversible by Idarucizumab

- Cardio Drugs
    - ACE inhibitors (-pril)
        - Site of action → pulmonary capillaries, endothelial cells
        - Used in hypertensive diabetic patients
        - Improves survival in HF patients (also beta-blockers and potassium sparing diuretics)
        - Contraindicated in patients with bilateral renal artery stenosis (Significant rise in creatinine after ACE inhibitor → renal angiography)
        - Hyperkalemia counteracts the Hypokalemia caused by loop diuretics
        - Scleroderma renal crisis (steroids are never the right answer for scleroderma)
        - Teratogenic → renal dysgenesis, oligohydramnios
    - Cardiac resynchronization therapy
        - EF < 35% + maximal medical therapy
        - Can improve survival
    - Spironolactone
        - Treat Hirsutism associated with PCOS
        - Used to decrease portal HTN in ascites along with Furosemide for chronic use
        - Conn syndrome, bilateral adrenal hyperplasia
        - Improves survival in HF
    - Beta-blockers
        - HCOM, improved survival in HF, migraines, akathisia
        - Initial DOC for thyroid storm is Propanol (peripheral conversion of Thyroid)
        - Labetalol (mixed alpha and beta blocker)
        - Hypertensive moms love Nifedipine
            - H = Hydraline, M= alpha methyldopa, L = Labetalol, N = Nifedipine
            - Pregnant anti-HTN drugs
        - Don’t give to patients with acute cocaine intoxication
        - Can be used to treat glaucoma (Timolol, etc)
        - Overdose → Atropine then Glucagon
        - Class II antiarrhythmic
    - Alpha-1 blockers
        - Prazosin - PTSD for nightmares (first-line is SSRI and psychotherapy)
        - Useful for BPH
        - Side effect → orthostatic hypotension
        - Tamsulosin (Blocks specifically alpha-1 receptors in bladder)
    - Alpha-2 blockers: Mirtazapine -> used for depression
    - Alpha-2 agonists : Clonidine (leads to rebound HTN)
        - Third-line for ADHD
        - Tourette’s
        - Can be used in opioid withdrawal
    - Loop diuretics
        - Peripheral edema, nephrotic syndrome, CHF
        - Loops lose Calcium → hypocalcemia, hypercalciuria (risk factor for nephrolithiasis)
        - NKCl(x2) transporter in thick ascending loop of Henle
        - Ototoxic (other ones are Cisplatin, Vanc, Aminoglycosides - Gentamicin)
        - Taking these is like having Bartter Syndrome

- Thiazide
    - Hypercalcemia with HYPOcalciuria
    - Stronger association with hyponatremia
    - Metolazone is an example
    - Taking these is like having Gitelman Syndrome
- Amiodarone
    - V Tach
    - Class III - K channel blocker
- Antiarrhythmics
    - Procainamide - Class Ia, used for WPW, can cause drug-induced lupus
- Verapamil → can cause hyperprolactinemia
- Nimodipine → post-stroke vasospasm
- Digoxin
    - Na-K ATPase blocker
    - Normal job - 3 NA leaves cell, 2 K in → hyperkalemia side effect
    - If patient is hypokalemic, more susceptible to Digoxin toxicity
    - Abdominal pain, yellow vision, diarrhea, etc
    - Contraindicated in WPW
- Causes of dilated cardiomyopathy
    - Trastuzumab
    - Doxorubicin
    - Clozapine → Myocarditis

Ep 256 [Rapid Review Series 41]

African kid, 8 years old, big jaw mass- think Burkitt's lymphoma. 8:14 translocation- will ultimately lead to amplification and leads to cells continually proliferating. Classically on histology, see starry sky pattern. EBV linked to this
EBV is associated with burkitt's Lymphoma, Hodgkin lymphoma with reed-sternberg cells (lymphocytes with bilobed nucleus), nasopharyngeal lymphoma, primary CNS lymphoma if pt has HIV.

Pt works in a barn with nuts, produce, grains- over the last 6 months, they have lost 20 pounds, and have jaundice. On labs- LFTs are high. RUQ- see liver mass. } think HCC. grains have aflatoxins, these are toxic to the liver.

Pt over the past 3-4 weeks has joint pain in knees, hips, fingers. See digital clubbing. NBS- CXR - this person has lung cancer, they have hypertrophic pulmonary osteoarthropathy, especially in adenocarcinoma.

Small cell- see SIADH (see hyponatremia, hypertonic urine, sp gr > 1.012), ectopic ACTH (high dose dexamethasone will not suppress the next morning's cortisol), lambert eaton myasthenic syndrome (decreased DTR, proximal muscle weakness, repetitive neurostimulation causes an incremental response. Doesn't affect the head and neck, more appendicular skeleton than axial skeleton). Tx- chemo
Lung cancer- also can be associated with poly/dermatomyositis.

Squamous cell lung cancer- famously cavitates. See air fluid levels in the lungs, abnormal of other lung cancers (especially small cell). Produce of PTHRP-> hypercalcemia,

#1 cause of hypercalcemia in the hospital = malignancy

Tumor markers

- +keratin = squamous cell cancer
- +chromogranin = tumor that is endocrine in origin. Common in small cell lung cancer.
- +GFEP = + in astrocytoma, glioblastoma multiforme
- +desmin - this is a muscle marker. Malignancy is arising from muscle, i.e. tuberous sclerosis- rhabdomyosarcoma.
- +vimentin - in leiomyosarcomas
- +S100 = neural crest derived - melanoma, langerhans cell histiocytoma, schwannoma
- +AFP- yolk sac/endodermal sinus tumor, HCC
- +Bhcg- choriocarcinoma
- +PSA - prostate cancer, more to monitor response to therapy
- +calcitonin- medullary thyroid cancer
- +CEA- colon cancer, pancreatic
- CA 19-9 - pancreatic cancer
- CA125- ovarian

Person with hyperandrogenism, + adnexal mass- sertoli leydig cell tumor. These are + testosterone. Person with hyperandrogenism, normal testosterone levels- NBS-> get CT abdomen/pelvis to see possible adrenal tumor, would be making DHEAS

Granulosa cell tumors- the call exner bodies on histology produce estrogen. See precocious puberty in a kid, especially girls. In a postmenopausal woman, you could see endometrial cancer due to unopposed estrogen (the #1 risk factor for endometrial cancer- unopposed estrogen)

Choriocarcinoma- see in a woman who recently had a baby, has hyperemesis gravidarum. Responsive to MTX. very commonly metastasizes to the lung. +Bhcg

Pt for the last 3 months has really bad morning headaches, get better throughout the brain. Brain imaging- calcification around vermis- think hemangioblastoma. Can produce EPO-> polycythemia.

Calcified masses

- Suprasellar, in a child, with bitemporal hemianopsia- Craniopharyngioma, derived from rathke's pouch (oral ectoderm)
- In the frontal lobe- oligodendroglioma. Fried egg appearance on histology.
- Adnexal mass, or in anterior mediastinum- think dermoid cyst/teratoma.
- Kid <1y/o, mass that crosses the midline- think neuroblastoma, in posterior mediastinum.
- Sarcoid - see hypercalcemia - is a granulomatous disease, non caseating granulomas. These contain epithelioid macrophages, these produce lots of 1a hydroxylase, and convert calcidiol to calcitriol.

MOA of hypercalcemia in multiple myeloma- the plasma cells secrete a lot of interleukin 1 AKA osteoclast activating factor!! Will activate osteoclasts-> hypercalcemia

Pt with adnexal mass, lost 15 pounds in the past 3 months, tachy, increased DTR, irregularly irregular on EKG-> think hyperthyroidism. This is struma ovarii- a teratoma with ectopic thyroid tissue. They have afib- most common arrhythmia in hyperthyroidism (but most common risk factor for afib is mitral stenosis)

Person with neck mass, prolonged QT - this is hypocalcemia, commonly from calcitonin/medullary thyroid cancer

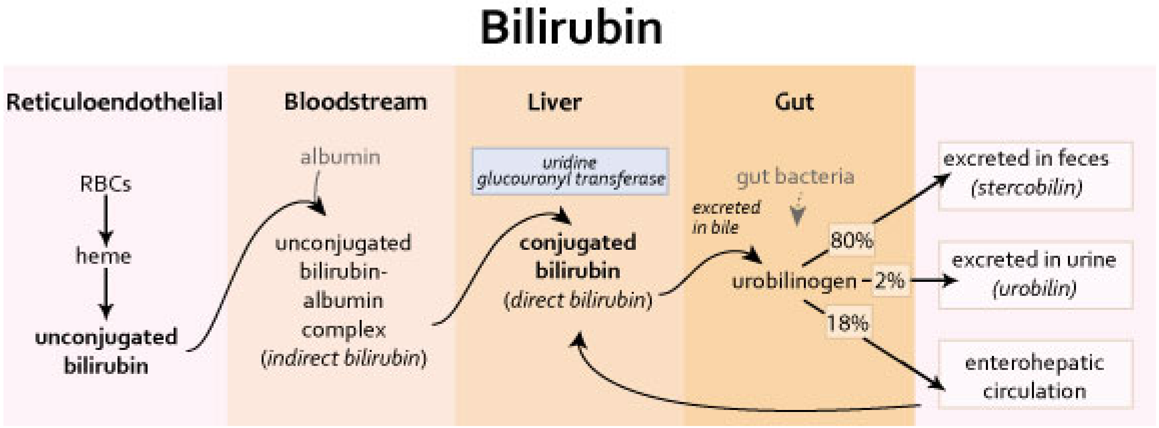
Alk Phos elevation- either from bone or liver process. Check GGT- if elevated, this is a liver thing, i.e. cholestatic process. If normal GGT, it's a bone problem- bone mets, osteoporosis, and paget's disease of the bone. Also can be caused by placental alk phos, i.e., in seminoma, pregnancy.

Ep 257 [Clutch Bilirubin Podcast]

Bilirubin Metabolism

1. Bilirubin breaks down from RBC to form hemoglobin (heme + globin)
2. heme + heme oxygenase converted to biliverdin
3. Biliverdin uses biliverdin convertase to convert previous step to indirect bilirubin
4. Indirect bilirubin is not water soluble so it needs to be carried by albumin.
5. Goes to the liver.

6. UDP glucuronyltransferase (UDPGT) → takes indirect bili → conjugates it → To bile canaliculi → intrahepatic ducts → extrahepatic bile ducts → squirt out of sphincter of oddi → helps to emulsify fat etc and some is reabsorbed in the terminal ileum.


Bilirubin
Reticuloendothelial
Bloodstream
Liver
Gut
RBCs
heme
unconjugated bilirubin
albumin
unconjugated bilirubin-albumin complex
(indirect bilirubin)
uridine glucouronyl transferase
conjugated bilirubin
(direct bilirubin)
excreted in bile
gut bacteria
urobilinogen
80%
2%
18%
excreted in feces
(stercobilin)
excreted in urine
(urobilin)
enterohepatic circulation

Hyperbilirubinemia

- **Unconjugated/indirect**
    - anything going wrong **prior to UDPGT** - UDPGT is an enzyme, can be saturated and lead to indirect bili build up
    - Hx of lupus, Hgb 8, total bilirubin 4, indirect bilirubin 3.5 → indirect bilirubin → Hemolytic anemia, i.e. **autoimmune hemolytic anemia** (a type 2 hypersensitivity reaction) - a.b. against own RBCs
    - Young man has hematuria every morning, arterial and venous thrombosis in the past = **paroxysmal nocturnal hemoglobinuria.**
        - PIGA mutation- can't make PGI anchors. Can't put CD55 or CD59 on the surface of RBC- these usually help the cell protect itself from complement mediated damage. Without it, the cells tend to hemolyze → UDPGT is overwhelmed with amount of hemolysis
    - **Sickle cell:** these RBC hemolyze easily
    - **Thalassemia:** these RBC don't last very long because the Hgb is abnormal → splenic macrophages destroys them more often
    - **HIV pt: CD4 count is 150**, start treating with **TMP SMX** and weeks after, gets fatigued. See labs: Hgb of 8, coombs test is negative, see indirect hemoglobinuria- this is **G6PD deficiency**. TMP SMX is a very powerful oxidant and without G6PD, you cannot make NADPH and you have no reducing power (via pentose monophosphate shunt/pentose phosphate pathway).
        - X linked recessive
        - **women will NOT get G6PD deficiency**
    - European kid with anemia, grandfather had a splenectomy- think **hereditary spherocytosis**. Problems with spectrin or ankyrin so don't have enough RBC

    membrane. When more fluid gets into them, they explode = hemolysis. Also, splenic macrophages destroy them.
  - “Spleen is quality control factory” lol
  - UDPGT enzyme deficiency, i.e. **crigler najjar**
  - Person with recovering acute illness/undergoes surgery, asymptomatic, see mild jaundice/ indirect hyperbilirubinemia → think **Gilbert syndrome**. Whenever they undergo stress, their small amount of UDPGT can get overwhelmed.
  - **physiologic jaundice:** newborn not using lungs → relative hypoxia in utero → increased EPO → very high hematocrit at birth (57%) → higher volume of RBC.
    - When baby is born, they have more oxygen → dont need as many RBC, trying to get rid of fetal hemoglobin. All these RBC need to be removed, and the UDPGT the baby has is not well developed yet anyway → bilirubinemia
  - **Rh/ABO incompatibility**- these RBC are demolished by antibodies
  - Newborn in the first week of life, mom is feeding the baby every 6 hours → this is **breast feeding jaundice**
  - Second week of life- **breast milk jaundice.** Pathophys isnt well known, but breast milk might have a substance that inhibits UDPGT!

- **conjugated/direct**
  - **think obstruction of bile flow**
  - Newborn- **biliary atresia**. Fibrosis of bile ducts-> inability to excrete bile. Do a Kasai procedure in the first few days of life. If you have had biliary atresia for 4+ weeks, baby will need a liver transplant.
    - Ddx- **choledochocyst**. Choose this if the answer choices do not contain biliary atresia
  - Kid
    - Asymptomatic- may have **dubin johnson OR rotor syndrome.** Differentiate with core biopsy of the liver.
    - **Black = dubin johnson.**
    - **Not black = rotor syndrome.**
    - This is just a mutation of a transporter (MRP1) that moves bilirubin from the bile canaliculi to the biliary tree.
  - Middle aged woman with pruritis, jaundice = **primary biliary cholangitis/cirrhosis.** Intrahepatic bile duct is affected. See antimitochondrial antibodies. Tx: ursodiol, ursodeoxycholic acid.
  - Middle aged male with hx UC = think **primary sclerosing cholangitis**- see beads on a string (strictures) in intra AND extrahepatic bile ducts. P-ANCA positive. Could try doing an ERCp to lyse the strictures.
  - Acute jaundice, mild RUQ pain, no fever = think **choledocholithiasis.**

    - If fever+ = is **Ascending Cholangitis.** Most cholangitis will be caused by untreated choledocholithiasis.
  - Recently had cholecystectomy, signs of peritonitis- think of **bile leak peritonitis**- bile is very irritating to the peritoneum. Dx- HIDA scan is very good.
    - Differentiating **bile peritonitis vs retained gallstone**- if stone, don't see signs of peritonitis.
  - **Pancreatic cancer**- may see **double duct sign** on u/s = see dilation of common bile duct and pancreatic duct because of pancreas obstructing flow.
  - Person with chronic cholecystitis/penetrating abdominal injury, the blood has very high bile content- this person has a **biliary vascular fistula.** (btwn bile duct and blood vessel)
    - Blood in the biliary tree- think biliary vascular fistula as well
  - Cholangiocarcinoma
    - Cause of direct bilirubin
  - Cholestatic pattern of liver labs
    - Direct bili is elevated
    - Alk phos is markedly elevated in relation to AST/ALT
- **Hepatic pattern of liver labs**
  - AST/ALT is disproportionately elevated compared to Alk Phos

- **“Alk phos conundrum”**
  - Alk phos elevated but GGT is normal- this is a **bone problem** causing the alk phos elevation.
  - To be a **biliary etiology,** GGT is typically elevated as well
  - Newish test - **5’ nucleotidase test** - if this is elevated, it will say if alk phos is a liver problem or not

Cross check: YES

Ep 258 [Rapid Review Series 42]

- 3 y/o or 23 y/o F or 56 y/o M (in other words any age) w. Fever 102.
  - Dx? Epiglottitis
    - Unvaccinated? H. flu
    - Vaccinated? Strep pneumo (probably)
  - NBS? (in order of importance)
    - Endotracheal intubation
    - Medication

            - Third generation cephalosporin
                - Ceftriaxone
                - Cefotaxime
        - Lateral neck radiograph
            - Thumb sign
- Pt just returned from deployment in some country. Person has had chronic cough, hemoptysis, lost 12 lbs since the onset of sxs.
    - Dx? Tuberculosis
    - How to diagnose?
        - Bronchoalveolar lavage
        - Induced sputum w. Acid-Fast Bacilli state (w. culture)
    - Treatment regimen
        - RIPE + Vit B6
            - Rifampin
            - Isoniazid
                - ADE
                    - Peripheral neuropathy (if B6 not taken)
                    - Seizures (if B6 not taken concurrently)
                        - Glutamate to GABA pathway
                            - Glutamate decarboxylase uses B6 as a cofactor
                    - Hepatotoxic (if B6 not taken)
                        - Also use B6 cofactor for enzymes
                    - Anti-Histone Ab Drug-Induced Lupus
                    - Can also cause microcytic, Sideroblastic anemia (if not taken with B6 concurrently)
                        - Due to B6 deficiency
                        - Synthesis of Heme first step involves glycine and succinyl CoA with ALAS, which uses Vit B6 as a cofactor
            - Pyrazinamide
            - Ethambutol
- Acid Fast organisms :
    - HIV-patient with Diarrhea. Acid Fast oocyst in patient stools?
        - Dx? Cryptosporidium parvum
        - Tx? Paromomycin or Nitazoxanide
    - Pt with Nocardia? Also has Acid-Fast
    - Tuberculosis induration cutoff
        - 5 mm in person with HIV
        - 10 mm in healthcare workers
        - 15 mm is positive in everyone.

- Pt. went to New Hampshire, New York, Connecticut, Boston on a field trick. Person has joint pain and has not noticed a tick bite. (Doesn't need to)
  - Dx? Lyme disease
  - Organism? Borrelia Burgdorferi
    - What are they? Spirochetes.
  - How to Dx?
    - ELIZA test + Western Blot (to confirm)
  - Treatment
    - <8 y/o
      - Amoxicillin
    - > 8 y/o
      - Doxycycline
        - C/I in pregnant patients.
          - Preggos get amoxicillin
- Assoc of spirochetes in syphilis and lyme disease and leptospirosis?
  - Jarisch–Herxheimer reaction
- Pt has classic erythema chronicum migrans?
  - Dx? Clinical
  - Tx? Doxycycline
- If a patient has Lyme disease that affects the brain?
  - D/C doxycycline
  - Give: ceftriaxone or cefotaxime
- If pt. Has Ascites for any reasons (budd chiari) w. Abdominal pain, AMS.
  - Dx? SBP
    - Translocation of bacteria
  - How to diagnose?
    - Paracentesis
      - > 250 mm neutrophil
  - Treatment
    - Ceftriaxone or cefotaxime
- Cefazolin is an ab given 30 mins before incision in surgery is made.
  - If surgery hour/time is changed and ab already given?
    - Give antibiotic AGAIN 30-60 mins before sx
- 22 F for the past two weeks sore throat, joint pain. Show you a picture and you see a big inclusion inside the cell (classic picture u want to recognize) - a big intranuclear inclusion.
  - Dx? CMV
  - Test?
    - Monospot is negative
  - Treatment
    - Ganciclovir

        - If resistant to Ganciclovir
            - Tx: Foscarnet
- Kid with congenital CMV?
    - Microcephaly and periventricular calcification
- Kid with congenital Toxo
    - Calcification diffuse across cortex
- Calcifications at frontal lobe - fried egg appearance.
    - Dx? Oligodendroglioma
- Peds with suprasellar mass w. Bitemporal hemianopsia w. Calcifications of mass
    - Dx.? Craniopharyngioma
- Calcifications at posterior fossa - Cerebellum w. High Hematocrit?
    - Dx? Hemangioblastoma
- Calcification around heart
    - Constrictive pericarditis
- Calcification around pancreas
    - Chronic pancreatitis
- Stippled, punctate calcifications around the gallbladder?
    - Dx? Porcelain gallbladder
        - Pt may have cholangiocarcinoma or gallbladder cancer
        - TX:
            - Elective cholecystectomy
- Calcified mass at pouch of Douglas, Adnexal mass.
    - Dx? Dermoid Cyst (teratoma)
- Calcifications around Kidney, HTN
    - Dx? Primary hyperparathyroidism
- Pt with diabetes and PAD.
    - ABI w. 1.5 (better than good) = PAD
        - Blood vessels have been calcified
        - Dx? Monckerberg calcific sclerosis (Diabetics)
            - ABI is “better than good”
                - NBS?
                    - Toe-brachial index

Ep 259 [Clutch Incontinence Podcast]

Physiology

- store urine in the bladder which is connected to the urethra that allows the urine to leave

- **Continence**
    - balance between bladder contracting and urethra closing.
    - When you want to urinate, the bladder contracts via the detrusor muscles. This forces urine out of the bladder and into the urethra → the urethra sphincter muscles (ring of muscle around urethra) have not relaxed yet. When it relaxes, the urine can be excreted.
    - The pressure in the urethra will normally exceed the pressure in the bladder- this keeps us continent. - (THIS is the main takeaway)
        - Urethral sphincter is supported by pelvic floor muscles, i.e. levator ani. These help it close as well as it should.

Stress incontinence

- **Presentation:** any increase in intra abdominal pressure (cough/sneeze/valsalva) → pee on themselves
- **Cause:** something has caused the urethra to lose support.
    - **Pregnancy**
    - **Obesity**
    - **Menopause**- because estrogen was important in these pelvic floor muscles to keep their tone/keep them strong. **Decrease in estrogen** = increased floppiness
    - In a guy- one who has had **prostate surgery**, i.e. TERP, removal of prostate, radiation therapy, brachytherapy.
        - May resolve within months
    - So, without support, bladder pressure is unbalanced with urethral pressure, and you will be incontinent (in terms of the main takeaway****)
- **Dx:** q tip test → 30 degrees of rotation
- **Tx:**
    - **Kegels** → will strengthen pelvic floor muscles
    - **Mid urethral sling procedure**

Urge incontinence

- **Most common type of incontinence in men (caused by BPH)**
- **Pathophysiology**
    - Detrusor muscles are too excited (**hypertonia/hypermobility**) → causes overactive bladder. Person has a constant urge to pee.
    - **Post void residual volume <10 mL**
- **Tx:** calm detrusor muscle with anticholinergic agent i.e. **Oxybutynin, Tolterodine, Darifenacin, Solifenacin, Trospium**
    - **Mnemonic: On The Darn Smelly Toilet**

Overflow incontinence

- **Post void residual volume = 100's of mL**

- **Pathophysio**
  - Detrusor muscles are “meh/basic attitude”. Normally they are supposed to sense that they are supposed to work, but now they are “**detrusor hypotonia/hypomobility/hypomotility/reflexia**”
- **Tx**
  - Cholinergic: **bethanechol, carbachol, neostigmine**
  - Acute setting: **catheter**

General information

- When a child is born, they have barely any nervous system. It is not well developed- this is why they pee on themself. When it begins to develop, these problems do not happen anymore

Mixed incontinence- multiple features of multiple kinds of incontinence

Urethral diverticulum/urethrocele

- **Presentation**: Someone has urinary incontinence- they **peed a few minutes ago**, now they have incontinence/are dribbling
- A diverticulum is an outpouching. When they pee, urine collects in the pouch

Cross check: YES

Ep 261 [USMLE Derm Part 3 of 3]

  - nto the bloodstream (which causes systemic sx)
- Person who recently start a drug regimen for acne – it’s an oral regime, this person lives in California (or any state with tons of beaches) and they went to the beach and they’re having a bunch of bad, extensive sunburns, even when they been using sunscreen [remember you should NOT apply sunscreen to a baby that is less than 6 months old] think about → ***TETRACYCLINE PHOTOSENSITIVITY***
  - Remember drugs that cause *photosensitivity*: “SAT for photo” mnemonic
    - S: sulfonamides; permethrin-sulfadiazine, TMP-SMX, sulfasalazine (IBD)
      - It could be by days or months, even years of use of sulfonamides [ie, person being treated with TMP-SMX for PCP prophylaxis for a year]
    - A: amiodarone [person that recently start an antiarrhythmic treatment and start having sunburns]
    - T: tetracycline; Lyme disease question, RMSF question, question of a person being treated for acne (oral tetracycline)

- Patient being treated for pyelonephritis with IV ciprofloxacin, and they have flushing on the body, really hypotensive, with muscle aches & pains → "RED MAN SYNDROME" (vancomycin also causes this!)
- Patient that recently started some kind of ATB, and a few days later they start to notice these round/oval discrete lesions on the torso, buttocks, back, etc → drug eruption, on NBME they call this a "fixed drug eruption"
- Collage student, 21 years old, pharyngitis (throat pain) 3 days ago and went to the student clinic where they gave her oral ampicillin, and she develop a diffuse rash all over her skin after taking ampicillin for 2 days → infectious mononucleosis from EBV
- Patient that for the past 2 days has been taking ATB or they just tell you this patient has had painful erosions on the oral mucosa and they tell you they see this purulent bullae and vesicles on the skin, and when they apply slight pressure over the skin you notice a lot of purulence (like purulent discharge and stuff), think about **PEMPHIGUS VULGARIS** (positive Nikolsky sign!)
    - It affects trunk, extremities (especially the more proximal extremities like arms or thighs) and DEFINITELY the oral mucosa and positive Nikolsky sign
    - Dx: direct immunofluorescence! You notice IgG deposits between the cells "intercellular deposition of IgG"
- **BULLOUS PEMPHIGUS** → tense bullae/blisters = Nikolsky sign is *negative*. Dx is also direct immunofluorescence, and you find a linear pattern in the *basement membrane*. NO ORAL MUCOSAL INVOLVEMENT
    - Linear deposition of IgG in the basement membrane you can find it in 2 disorders in the test: bullous pemphigus (in the skin) and in Goodpasture syndrome (in the kidneys or in the lungs – it's a nephritic sd presentation, type II HPS reaction)
    - Pemphigus vulgaris & bullous pemphigus are type II HPS reactions
    - Treatment of choice for any pemphigus → oral steroids; if the person is not getting better, *best next step in management* is plasmapheresis (2nd line treatment) (In addition to steroid o therapy, which of the following medications can be added to decrease the morbidity or hasten sx resolution… Plasmapheresis)
- Person with iron deficiency anemia with very itchy vesicles in elbows, knees, back, buttocks (lot of extensor surfaces) + low weight celiac disease and this person has **DERMATITIS HERPETIFORMIS**
    - 1st step in management is to exclude gluten from diet, usually this works, but if you don't see this as an answer choice, the 2nd line treatment is *dapsone*
    - If a guy is started on dapsone for dermatitis herpetiformis, and then they start to have hematuria and indirect hyperbilirubinemia → G6PD deficiency!!
    - Remember Dapsone is also used in the treatment of leprosy! You give a triple therapy: dapsone, rifampin, and clophazimine.
    - Dapsone is sometimes used for PCP prophylaxis

- IV drug user, that on the back of his hands has vesicles/bullaes and notice more of these vesicles after he hit his hand on a table or some minor trauma that should not cause that kind of skin reaction, especially on the back of the hands → **PORPHYRIA CUTANEA TARDA!**
    - Which of the following is the biggest risk factor for PCT hepatitis C. About 50% of people that have PCT tend to have HepC infection. Test the patient for hepatitis C, HCV PCR or HCV antibodies in serum.
    - Since is a heme synthesis disorder, if you take urine from them and put in on the Woods lamp the urine will give a dark orange color
    - If you do direct immunofluorescence, you'll see IgG deposit around capillaries that line the dermis and around the basement membrane
- Patient with vesicles in the lip or in genitals, and they say they had these lesions many times but you also notice this person also has multiple "bull's eye" lesions in the skin → **ERYTHEMA MULTIFORME**
    - Biggest risk factor for erythema multiforme in this patient? Having a lot of HSV infection, especially on a recurrent basis.
    - It can also be caused by drugs: sulfonamides, penicillin, phenytoin.
    - Tx: stop the drug, supportive care, fix any electrolyte problem
        - Specific scenario with a person with EM + recurrent HSV infection → best long-term management? Suppressive acyclovir (like on a regular basis – prophylactic). Is NOT going to work in the acute setting!
- **STEVEN-JOHNSON SYNDROME (SJS) & TOXIC EPIDERMAL NECROLYSIS (TEN)**
    - Person with flu-like sx, like myalgias, fever, and then they start having skin erosions & skin pain with a positive Nikolsy sign. The percentage of the skin that is affected is what tells you what you're dealing with:
        - If is less than 10% of the skin: SJS
        - If is more than 30% of the skin: TEN
        - Between 10-30%: SJSTEN combination
    - 1st step in management? STOP THE DRUG!
    - Patient with a bad presentation, particularly TEN → get them into a burn unit – UCI!
- African-American female, with painful lesions on lower extremities, they are round and tender → **ERYTHEMA NODOSUM**
    - Associated with sarcoidosis, coccidiomycosis, IBD
- African-American female + sarcoidosis, purple colored lesions in her nose, around her eyes, in a malar style distribution (like around the cheeks) → "lupus-like" presentation, think about something called **LUPUS PERNIO**, is a classic dermatologic finding in the face in a person with history of sarcoidosis
- 23 year old male, history of chronic bloody diarrhea, 3-5 months, lost a lot of weight during this period, and now he has a very painful ulcer, necrotic that is very exudative, with lot of discharge from the ulcer, with raised edges, it is on his lower extremities → **PYODERMA**

GANGRENOSUM (classically found in patients with IBD). Best next step in management? COLONOSCOPY! usually is UC that has this association.

- Patient chronically been treated, has **ESRD**, and is being receiving treatment for an epidural abscess found on **MRI** 2 days ago, over the last 12h this patient is having induration of the skin, the skin is very thick and very tight → **NEPHROGENIC SYSTEMIC FIBROSIS** (NSF), it is caused by Gadolinium (usually when getting an spinal imaging they use gadolinium)
  - Most likely predisposing factor for this disease? ESRD; they get it in the context of getting gadolinium
- Patient with ESRD, really painful nodules under the skin, they look red/brown → **CALCIPHYLAXIS**
  - In ESRD patients have ↑↑ phosphate → not able to maintain an appropriate solubility product for Ca^{+2} and phosphate → this will begin to precipitate in the skin as red/brown nodules
- IV drug user, over the last 3 days, and is having big breakouts like oily lesions on skin, head, basically like seborrheic dermatitis that suddenly breaks out, best next step in management? Test for HIV
- Patient that had recent cardiac catheterization OR was recently diagnosed with vasculitis; and now it has net-like lesion in the extremities → **LIVEDO RETICULARIS**.
- Patient with velvety lesions on flexor surfaces, like in the neck or under the breast → ACANTHOSIS NIGRICANS, usually due to insulin resistance, ex DM; it can also be a sign of a GI malignancy.
  - In OBGYN is a patient with PCOS
- Patient with genetic syndromes like familial hyperlipidemia → xanthomas/xanthelasmas in the eyes, especially on the eyelids, around the ankles, soles
- Patient with proximal muscle pain and/or weakness and hands looks like concrete, fissured, thick [think about a mechanics hand?], this is a very classic finding on a person with autoimmune myopathies like polymyositis or dermatomyositis
- Person with Hb 7, SCr has being progressively ↑↑↑ over the last year, and has had 3 episodes of pneumococcal pneumonia, and you notice this patient has a large tongue and has sallow skin, it means that the skin looks like kind of wax → MULTIPLE MYELOMA.
  - MM can present as amyloidosis on a test, people who have amyloid tend to get big tongues, restrictive cardiomyopathy, they can get amyloid kidney disease.
- Crusted lesions around the nipple, kind of looks like eczema → **PAGET DISEASE OF THE NIPPLE**. They need mammogram and a core biopsy of the breast, because they tend to have underlying infiltrating intraductal carcinoma
- Middle-age patient with a lot of eczema (especially on flexor surfaces), like under the feet, elbows, or underside of the knees, also this person has been losing weight & new onset diabetes → **GLUCAGONOMA**. The skin lesions are called **NECROLYTIC MIGRATORY ERYTHEMA**.

- Patient with history of HIV with a low CD4 count and went swimming recently (beach, pool), now has a painless lesion that started on arms or trunk, but has quickly become necrotic and is painless → **ECTHYMA GANGRENOSUM**

Ep 262 [Clutch TB]

Screening for TB
1) TB skin test or 2) interferon gamma release assay

- specific scenario – an immigrant or someone that came from a foreign country less than five years ago, and the patient has received BCG Vaccine. If asked to pick a screening test for TB, and the answer choices has both TB skin test as well as Interferon gamma release assay, Pick Interferon gamma assay test

- Another scenario, where the patient has not visited the doctor for more then 5yrs or is not compliant with doctor visits or you are sure that the patient will not follow in the next 48hrs to 72 hrs (as required for TB skin test) – Administer Interferon Gamma assay test.

Whether a person has received the BCG vaccine or not, the TB skin test results are always interpreted the exact same way

5mm Induration – Seen in immunocompromised

- HIV
- Transplant patients on immunosuppression
- Chronic prednisone therapy for some autoimmune disease
- A person who came in contact with a patient with active TB

10mm induration – High risk individuals or people in groups

- An immigrant, who came from a foreign country less then 5 yrs ago
- IV drug user
- People living in crowded places like Jails / Prisons / nursing home / hospital
- Healthcare workers

15mm induration – positive in every person

TB skin test or Intereon gamma assay can never differentiate between Latent TB or Active TB

It is important to differentiate between Latent TB and Active TB, because the treatment is different for both conditions

Latent TB – should meet 3 criteria

- Positive TB skin test or interferon gamma assay
- CXR must be negative
- No systemic manifestations of TB (negative for cough, hemoptysis, night sweats, weight loss)

When a patient meets the above criteria for Latent Tb, the following treatment is recommended

Primary Regimen

- Isoniazid + Vit B6 for 9 months , especially for healthy and / or immunocompromised patients

Other Regimens

- In normal healthy patient INH + B6 for 6 months or Only Rifampin for 4 months is recommended too

Active TB – Symptomatic patients- B symptoms

- Night sweats, fever
- Chest pain, Cough, hemoptysis
- Diseased population could include TSA agent, an immigrant or a person who has travelled outside the country recently (in the last couple of months or couple of years & came back not too long ago)

If you suspect active TB in a patient, try to get a sputum sample, either by

- Broncho-alveolar lavage or
- Induced sputum sample

Subject the sputum sample to AFB smear, a negative AFB smear does not rule out TB. The gold standard for diagnosis of TB is sputum culture. It takes weeks for TB to grow.

If there is a test that says that the AFB test is negative, you asked what is the next best step? and in the answer choices there is no TB culture. Choose PCR testing or NAAT test to diagnose TB

Active TB is treated for 6 months total with

- RIPE + Bit B6 (Rifampin, INH, Pyrizinamide, Ethambutol) for 2 months
- INH + Vit B6 + Rifampin for the remaining 4 months

Criteria to determine that an active TB patient can come out of isolation or can mingle with the world are

- Atleast 2 weeks of therapy
- Patient is getting better clinically
- Atleast 3 consecutive negative AFB sputum smears

Preventive measures to remember before starting TB regimen

- Check for uric acid levels before starting pyrazinamide . Pyrazinamide can trigger gout
- Ophthalmological testing : check for visual acuity & color vision before starting ethambutol
- LFTs

CXR in active TB : cavitary lesion , u/l Pleural effusion, Miliary TB, unilateral hilar lymphadenopathy

TB can also affect other parts of the body like
CNS -> TB Meningitis – CSF = Elevated opening pressures, Elevated lymphocytes, Elevated proteins, low glucose
Diagnoses is by AFB of CSF, PCR of the CSF (best test)
Treatment if TB meningitis is similar to treatment of lung TB.

Bones -> TB Osteomyelitis = s/s back pain + TB risk factors
Vertebral osteomyelitis (Pott's disease)

Mycobacterium Avium: In HIV patients with CD count < 50, MAC prophylaxis is no longer recommended.

MAC can show up in non-HIV patients as well. Eg an old woman or white female very thin with connective tissue disorder or chest wall anomaly (pectus excavatum) / Scoliosis / symptoms of TB + MV prolapse
When presented with above, think of MAC infections
Treatment is macrolides (make sure people do not have QT interval abnormality (that is not prolonged) before starting these drugs)

Ep 263 [Clutch CNS Infection]

Patient , an IV drug user with weight loss over the last 1 year + severe headache , nuchal rigidity x 3 days + very high fevers
CSF studies =
High Protein count,
Opening pressure = (very high) 300, Low glucose ~ 10,
Increased WBC with lymphocyte preponderance
Next best step in diagnosis?

- Lumbar Puncture

- Send CSF fluid for Latex agglutination test or Indian Ink

Diagnosis : Cryptococcus neoformans, most common cause of meningitis in HIV patients
Treatment : Amphotericin B & Flucytosine to gdt them over the hump, followed by Fluconazole prophylaxis (for 6 to 12 months) to decrease the risk of recurrence

If the patient is on HART , initially CD4 count= 55, c/o generalized Tonic Clonic seizures in the last 2-3 days. EEG is unremarkable. Brain imaging shows calcifications around caudate & Putamen.
What is the next best step in management?
Diagnosis : Toxoplasmosis
Ans: Treatment with Pyrimethamine & Sulfadiazine

Note: When the CD4 < 100, start prophylaxis against Toxoplasmosis with TMP-SMX. Toxoplasmosis is a protozoan, it presents as a ring-enhancing lesion in brain imaging in HIV patients. It causes brain calcifications especially in the basal ganglia (caudate, Putamen, Globus pallidus)
Prophylaxis of Toxoplasmosis is different from Treatment of Toxoplasmosis
Prophylaxis for Toxoplasmosis: TMP-Sulfamethoxazole
Treatment of Toxoplasmosis: Pyrimethamine & Sulfadiazine

Qn: If the patient is pregnant, then Pyrimethamine and Sulfadiazine are contra-indicated because they are anti-folate. They may lead to neural tube defects.
So in such cases: give Spiramycin

Whenever you give a patient Pyrimethamine & sulfadiazine: add Leucovorin (Folinic acid analog) to the regimen, to prevent bone marrow suppression

Calcification patterns CMV vs Toxoplasmosis in congenital infections

CMV causes calcifications around lateral ventricles whereas Toxoplasmosis causes calcifications in basal ganglia / Caudate

Eg: A Farmer, whose son plays with a pig , has s/s seizures 3 weeks ago. Had another seizure one month before. His pediatrician noticed that 3 months ago his heart circumference was 30th percentile but now it is 97th percentile.
Diagnosis: Taenia Solium-> cysticercosis
Usually acquired when you consume food or water that has been exposed to eggs of this tapeworm. They grow in the brain and form cysts that are calcified which can ultimately lead to seizures.
Sometimes patients can present with hydrocephalus

Treatment: Bendazoles like Albendazole / Mebendazole
+ steroids to reduce inflammation and therefore seizures

Patients found at home poorl;y responsive complaining of severe facial pain + high fever. His medical history is unknown, but takes insulin everyday. And hihs glucose is 465, bicarb is 14. High leukocytosis = Think mucormycosis, especially Rhizopus
Both species can cause infection that starts in frontal sinuses and can spread to the brain especially the frontal lobe , treat by debriding extensively and then give amphotericin B.

A patient, a swim instructor noticed that over the last 2 days, he is having fever and then they tell you that this person died two days afterwards. Think of Naegleria Fowleri, causes problems especially in people who swim in fresh water and they die very rapidly. This loves torch frontal lobes as well
Can be managed with Amphotericin B, but most often the infection is fatal.

In the exam, they may not mention fresh water swimming, but indirectly associate the situation to water

Qn: A patient, who recently immigrated to USA from Africa like 10days ago as an exchange student,He was fine initially but he has been somnolent/sleepy , refusing food and losing a lot of weight
Think of Sleeping sickness, it occurs when a person gets infected with trypanosoma brucei.Vector is TseTse fly. Initially it is a bloodborne infection, over time these bugs find a way to the brain. It is called sleeping sickness because these bugs release chemicals in the brain that kind of makes the infected person sleepy.
The patients also refuse food, and they usually die of starvation.
Diagnoses: Lumbar Puncture , CSF will have elevated IgM against these pathogens
Treatment : 1) Pentamidine (also used to treat Pneumocystis Jiroveci)
2) Melarsoprol , specifically used for second stage disease, when the CNS is involved

Qn: A patient comes to you in July, has mental status abnormalities. You perform lumbar puncture. CSF has normal glucose, normal opening pressures, WBC slightly elevated, Lymphocyte predominance (90%). What is the next best step in the management.?
Ans: Supportive care, because it is viral meningitis maybe 2/2 enterovirus. Enterovirus is the most common cause of viral meningitis.
Qn: Patient who is an IV drug user, has HIV . CD4 count is 40. He has been somnolent for the last couple of days. CSF analysis: Opening pressure is normal, glucose is normal, Slight increase in WBC with lymphocyte predominance. RBCs = 0-5/hpf
Ans: Think of CMV , HIV +ve, CD4<50, + all the above features
Treatment: Ganciclovir or Valganciclovir, if these are not working -> give Foscarnet (pyrophosphate analog). Because drugs like Ganciclovir or Valacyclovir need activation by kinase to start working. But Foscarnet does not require any activation. Its already been phosphorylated , there is very high threshold for resistance. That's why it is preferred in patient infected with herpes or CMV that are resistant to standard therapy
To differentiate CMV from Herpes, look for RBC in CSF. If RBCs +ve => Herpes
Cryptococcus = will have elevated lymphocytes, high opening pressures, glucose will be very low and protein will be very high

Cells with intranuclear inclusions = owl's eye nucleus

Toxo causes calcifications in the brain in congenital case but Toxo causes calcifications all through the cortex or calcification in basal ganglia that is caudate, putamen= around thalamus area

But if the qn mentions calcifications around the ventricles = think of congenital CMV.

Herpes
Herpes tends to involve the temporal lobes . In the imaging if you are seeing brainstem, and some part of cortex, that some part of cortex is the temporal lobe flanking the brainstem. One temporal lobe looks too white or does not look similar to other temporal lobe on radiology => temporal lobe pathology 2/2 herpes.Think of temporal lobe encephalitis with HSV . HSV loves to cause ton RBCs in the CSF. Treat with IV acyclovir

Rabies = can cause brain infection , acquired via animal bite like dogs, raccoons, skunks, coyotes
The rabies virus first gets to the NMJ-> binds to the Ach Receptor => will replicate around NM -> then through retrograde transport travel through the neuron to the brain=> 100% fatal.
Patient presents with spastic paralysis + refusal to drink water because the throat muscles are beginning to spasm, rejecting the water.
Treatment: Rabies Ig, also injected right into the wound, so that they can bind up as much as the rabies virus as possible

Give vaccine as well, but give it on the contralateral extremity. Don't give vaccine and Ig in the same spot, as they both can bind up and may not work against infected viruses inside the body. Therefore always give the vaccine and the Ig in different extremities, because you don't want the immunoglobulin to bind up the vaccine.
If the patient with rabies dies, biopsy findings on brain will show pink intracytoplasmic inclusions called the negro bodies.
Differentiate this from intranuclear inclusion bodies of CMV

Qn on polio-> immigrant style qn -> infection of the spinal cord especially the ventral horn/anterior horn->low motor neuron problems-> muscle paralysis
There is a vaccine against it.

Qn: Newborn, 2 days old high fever, nuchal rigidity, septic
Ans: Group B Strep Agalactiae, because it is the common cause of meningitis in the first 20 days of life- defined as neonatal period
Treatment: 3rd generation Cephalosporin, Ampicillin

Most common surface of infection for Group B Strep in the newborn -> Maternal vagina
this is why we screen women that are pregnant between the ages of 35 to 37 weeks gestational age -> screen for GBS

Qn: If Meningitis in the first 28 days of newborn period and GBS is not the answer choice, then look for E.Coli. E.Coli is the second most common cause of meningitis in the Newborn
right in newborns from 28 days to the first 20yrs of life.
Treatment : Third generation cephalosporin, ceftriaxone, ceftazidime,

If both E.Coli & GBS are not listed in the answer choices, then pick Listeria (Third most common cause of Meningitis in NewBorn. Treat with Ampicillin.
If the mom is exposed to deli meat, hot dog, soft cheese and all that stuff -> transmits to the baby. Can cause granulomas across the body of the fetus – Granulomatosis Infantisepticum

Qn: A patient with meningitis + skin findings (petechiae + purpura)
Ans: Meningococcal Meningitis
Neisseria Meningitidis classically presents skin findings along with meningitis. Gram stain of CSF will be Gram -ve diplococci.
Treat with Ceftriaxone
Also treat the close contacts: Cetriaxone or rifampin or Ciprofloxacin. Most preffered is Rifampin.
But if the close contact is a pregnant lady: treat with ceftriaxone because you cannot give Rifampin or Ciprofloxacin during pregnancy

Prevention: there is a vaccine against Neisseria meningitidis

Qn: Strep Pneumonia can cause meningitis as well. Bacterial infection therefore the CSF will have low glucose, high CSF protein and elevated WBCs with neutrophil predominance. Opening pressures will be very high. Gram stain of CSF will show Gram +ve diplococci
Treatment : Ceftriaxone + Vancomycin + steroids (to decrease the morbidity associated with infection)

TB meningitis: CSF opening pressure is high, protein is high, glucose is low, WBC elevated but iwht lymphocyte predominance
Imaging of the brain = enhancement/hyperintensity of at the base of the brain
Treatment = RIPE + Vit B6 + Steroids

Preventive measures for healthcare workers how will be exposed to TB patients or COVID19 are – Respirators = N95 masks

Syphilis: can cause a lot of pathology in CNS
- Tabes dorsalis -> dorsal column is affected= Abnormal fine touch, vibration perception, positive Romberg sign, Aryl Robertson pupil (they accommodate but do not react) – Cranial nerve involvement-> no consensual pupillary reflex

Treatment: Penicillin

Ep 265 [Male Reproductive Pathologies and the USMLEs]

- Newborn not urinated since they are born, dorsal surface groove = **Epispadias** (associated with bladder exstrophy = bladder outside of body like gastroschisis or omphalocele of body)
- Don't circumcision as you need foreskin to fix the prob
- **Hypospadia** = urethra coming out of to ventral of urethra
    - cause UTI, problem with ejaculation
    - can have cryptorchidism
- Biggest **RF = Penile cancer**
    - HPV 16,18, & 30s, smoking, uncircumcised
    - Squamous cell kind, person has penile malignancy, biopsy show *keratinization*
    - Malignant cell limited by basement membrane = **Bowen disease** (squamous cell carcinoma in situ)
        - outcome = resolution but 10% -> progress to invasive cancer
    - any SCC can present with PTH-rp paraneoplastic syndrome = hypercalcemia
- **Cryptorchidism** = testis didn't descend (androgen causes descent in 3rd trimester)
    - seen in androgen insensitivity syndrome
    - If testis kept in pelvic cavity = **cant maintain blood body temp = cant make sperm (**but scrotum has <2degree can make it)
    - Most common location for cryptorchidism is the inguinal canal
    - following associated reproductive anomalies = **inguinal hernia** = common in kids with cryptorchidism
    - increase risk of testicular cancer = even after descent of 1 testis
    - if stuck = testicle go atrophy hence get them down quickly as possible
- Bilateral testicular atrophy is associated with = **klinefelter syndrome 47 XXY**
- **Testicular enlargement** is associated with Fragile X syndrome (CGG repeats, have ADHD and intellectual disability), alport syndrome, mumps (25-35% = inflammation = orchitis)
- 19 y/o M, sexually active, does not use condom consistently, pain & tenderness along the rim of scrotum (pain linear band, extended out of scrotum, radiating to groin) = **epididymitis**
    - cause = *N. Gonorrhea or Chlamydia (*young adults) = tx with ceftriaxone or doxycycline/azithromycin, old people = *E.coli* (tx with bactrim, ciprofloxacin)

- Newborn comes for 2 wk visit, accumulation of fluid in testicle/small palpable mass = **Hydrocele**
    - fluid accumulates because tunic vaginilis didnt close/**failed obliteration/transudate accumulation**
    - Differentiate it from testicular cancer = **transillumination = hydrocele does but** testicular cancer doesn't
- **20-30s** y/o M, infertile, trying to have kids, have sex many times a week, wife has kid from previous husband
    - cause = **varicocele (bag of worm =** physical exam = palpate pt's ball)
    - dilation of the pampiniform plexus → pooling of blood → impaired heat exchange → scrotum and testes temperature rises → sperm production decreases
- Young guy, was studying for exam, has sudden onset groin/testicular pain, rushed to hospital = **testicular torsion** (dx testing not done) = don't do U/S → move straight to exploratory surgery
    - Epididymitis will usually have systemic sx if caused by STI whereas testicular torsion will not
    - spermatic cord twists suddenly = stops venous drainage = just like central retinal occlusion
        - The problem is not really with arterial blood flow
    - if testicle doesn't drain = testicle die = infertility
    - surgical explore testicle = detorsion & bilateral orchiopexy (fix testicle to the wall of scrotum) = reduce risk of future episode
    - most likely finding on U/S = decrease blood flow
    - has **decrease cremaster reflex** (normally testicle elevates with stroke of inner thigh)
    - severe pain along upper pole, nodular blue discoloration (torsion of **appendix testis**, slightly different from testicular torsion, this is torsion of a vestigial structure)
    - In testicular torsion if no Tx within 6 hours testis die from hemorrhagic infarction (remember lack of venous drainage)
- Some guy, playing game was hit in balls by bat, felt like mass & comes to clinic weeks later
    - dx = **germ cell tumor** (95% of testicular cancer)
    - testicular or ovarian cancer tx = cut out the whole thing no need to do biopsy then send it for analysis
    - Androgen insensitivity syndrome 46 XY, male genotype, female phenotype = has high risk of seminoma
- **Seminoma** = no real tumor marker (no afb, b-hCG), **human placental lactogen** (diabetogenic hormone = leads to insulin resistance in pregnancy, but marker for placental site gestational trophoblastic disease and seminomas)
    - Seminoma = radiation & chemo = good prog
    - if spread = orchiectomy then chemo & radiation
- Other testicular cancers
    - 2nd most common testicular tumor = **embryonal carcinoma**
        - bad prognosis
    - **Yolk sac** (endodermal sinus tumor)
        - biopsy = schiller duval bodies (glomeruloid bodies)
        - Serum biomarker = AFP
    - **Choriocarcinoma**
        - biopsy = syncytiotrophoblast
        - Serum biomarker = b-hcg
- **Leydig cell tumor**

        - presents in kid with precocious puberty (because the tumor produces excess androgen)
        - histologically = rinkie crystals (intracytoplasmic rod shaped)
- **BPH**
    - **acutely** -> **alpha-1 blocker** (prazosin also help with nightmares in PTSD, doxazosin)
    - AE? systemic vasodilation = decrease SVR = reflex tachycardia,
    - Avoid systemic vasodilation by giving tamsulosin i.e flomax (blocks alpha-1 receptor found on prostatic urethra)
    - **DHT** = grows prostate, comes from testosterone via 5 alpha reductase (blocked by **finasteride**/long term = shrink size of prostate)
    - if nothing works use Transurethral resection of the prostate (TERP)
- **Chronic prostatitis** = few months, has urinary symptoms (ex dysuria), tons of WBC but no bacteria, back or perineum pain
    - if sx only for **few days + bacteria + prostate tender = acute prostatitis**
- **Prostate cancer**
    - **BPH does NOT increase your risk for prostate cancer**
    - age = biggest risk factor
    - blastic metastasis
    - Most common metastatic location = vertebral bodies

Ep. 267 USMLE and Normal Changes in the Elderly

Top to the bottom of the individual:

Brain:
Gets smaller as we get older (ie they are susceptible to subdural hematomas and stretch the bridging veins and can shear)
Cerebral blood flow also goes down
Non-specific white matter changes → normal (as long as they don't have symptoms)
MSSE: mild defects, doesn't mean Alz
Working memory goes down
ADL's or missing on way back from store → that's NOT normal, must work up

Nervous system:

some mild opacification of lens is normal if pretty good visual acuity, which also goes down, but this isn't cataracts
Anosmia is normal in old people
High frequency sounds goes down
Vestibular system gets worse as you get older (knowing where you are in space)

CV:

Pulse pressure widens (spread between systolic and diastolic) systolic BP goes UP and diastolic goes DOWN, so wider pulse pressure
HR goes down as you get older (fibrosis of conducting system), so CO goes down as well
Baroreflex also stops working as well
HY: blood vessels become less compliant, less elastic → inc in systolic BP as they get older
Heart gets smaller, so if you see a big heart that is NOT normal (number of cardiac myocytes goes down and smaller)

Lungs:

Pulmonary reserve goes down
FEV1 goes down
Smoking accelerates this obviously, if they stop, FEV1 will decline less harshly but never normal as if they never smoked
Lungs are not as good at recoiling when they are old
Mucus is hard to clear

GI:

Mild malabsorption because vili atrophy
GERD because esophagus isn't as good at peristalsis
Liver mass goes down, so unable to deal with toxic chemicals and alcohol and drugsDecreased bone marrow density
Anemia
Less able to absorb calcium and iron in gut → bigger incidence of fractures and osteoporosis
Mild proteinuria is normal

GU:

Increased urinary frequency and incontinence → bladder holds less
HY: Cr should go up little by little, because Cr clearance isn't as robust

Bone marrow density goes down → Decreased activity of 1a-hydroxylase in kidney cells

Androgen levels go down → libido goes down (Atrophy of testicles and ovaries which house the theca-lutein cells which produce androgens)

Estrogen also goes down from the ovarian atrophy → more osteoporosis, painful sex

Men → sperm count goes down

Should not be able to palpate ovaries in old woman → think cancer if palpable

PTH goes up, leach your bone of calcium → MORE osteoporosis

Insulin secretion goes up

NE and vasopressin go up

Thyroid hormone and ACTH go down → metabolic rate goes down

Skin:

Thickness of epidermis and dermis goes down (thin) → due to decreased activity of fibroblasts → less collagen

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Ep. 268 Clean SP 4 - (Palliative Care 2)

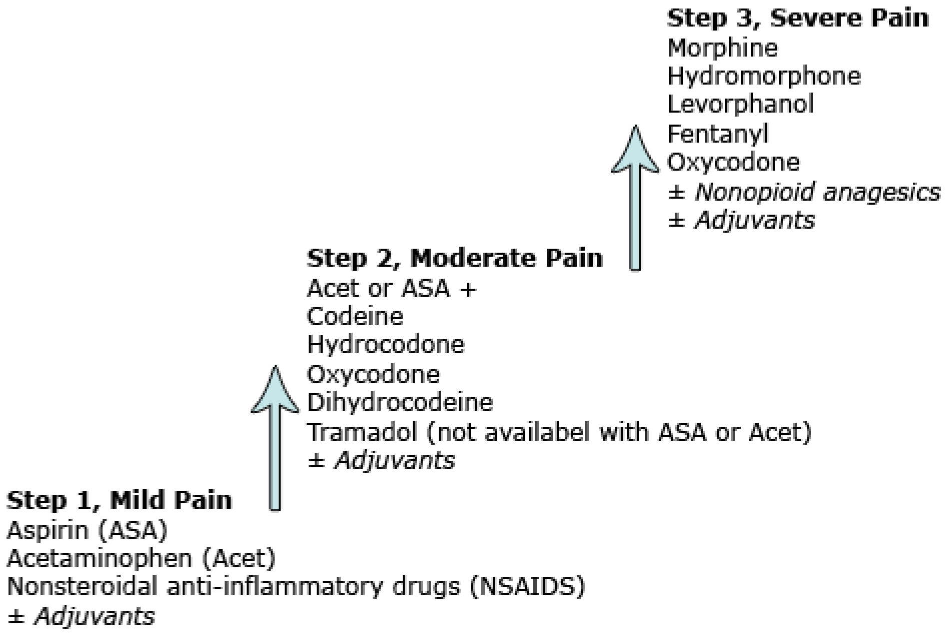
- Palliative care → for seriously ill patients
- Not only for the wellbeing of the patients - but it's also for the well being of their families
- Misconception: doing it just because the person is sick or doing it just because you think the person is going to die. NO!! → you do palliative care at any stage of the illness (even if the treatment intention is curative).
- There is no age to be qualified for palliative care

PALLIATIVE CARE DOCUMENTS COMMONLY TESTED ON EXAMS

Before giving the patient a bunch of papers to fill, find out what are the patient's values/preferences "What does the patient want?"

- Living will: patient directions - ie, talk about the extent of life-sustaining treatment (especially if they become very ill or go into a vegetative state), is the patient saying what saving measures to take or not to take in the case he/she becomes incapacitated and unable to make decisions.
- Durable health care power of attorney (POA): a legal document where you designate someone to make healthcare decisions for you.
    - The difference from a living will is that a living will focus on interventions that either deal with withholding care or withhold life-sustaining intervention
    - POA: have a lot more power, they have much broader scopes in the kind of decisions that they can make
- *If there is a patient in the ICU, and the physician tries to create an order sets - the physician asks the patient or it POA, "what would you like us to do if x or y happened?" → this is called **POLST**
    - Physician orders of life-sustaining treatment
    - It deals with how the patient is currently doing right now, not like in a hypothetical situation in the future
- If a patient has a living will or a POA, or has gone over a POLST, BUT the patient is still lucid and is still able to make their own decisions, the patient's own decision supersede this other stuff.

When a person is going through palliative care there are some key classic sx of end of life that you would have to manage:

- For a patient that is going through a lot of pain, keep in mind (especially if it is a terminal illness) there is something that was released by WHO, to manage pain is the 3 stage analgesic ladder
    - Measures pain with VAS, so from VAS 1-3 use step 1, from VAS 4-6 use step 2 & from VAS >7 use step 3
    - 
Step 3, Severe Pain
Morphine
Hydromorphone
Levorphanol
Fentanyl
Oxycodone
± *Nonopioid anagesics*
± *Adjuvants*
Step 2, Moderate Pain
Acet or ASA +
Codeine
Hydrocodone
Oxycodone
Dihydrocodeine
Tramadol (not availabel with ASA or Acet)
± *Adjuvants*
Step 1, Mild Pain
Aspirin (ASA)
Acetaminophen (Acet)
Nonsteroidal anti-inflammatory drugs (NSAIDS)
± *Adjuvants*
      (Source: https://assessment-module.yale.edu/im-palliative/pharmacologic-approaches-pain-management)
    - Classic NBME scenario → When a patient has pain from metastasis disease (severe pain/severe sx), and opioids are not enough you can increase the dose, titrate it so the patient does not have the side effects from the opioids, or increase the frequency (this are rescue doses)
- Patient with metastatic disease to the bone and they're getting a lot of fractures from those bone mets, to help these people with the pain (and they don't give opioids as a choice), give bisphosphonates or calcitonin is IDEAL!
- Patient with a malignancy that has metastasized to the bowel or primary bowel malignancy (like primary colon cancer that is obstructing the bowel, or primary gastric malignancy that is obstructing the stomach; even melanomas like to metastasize to the small bowel) - any malignancy that is obstructing the GI tract, these patients will benefit from an anticholinergic agent - glycopyrrolate → muscarinic receptor antagonist; it can mess up with GI motility (use it cautiously!), so it makes your bowel "not work", so your bowel won't be contracting and it won't contract against that resistance (the obstruction)
- Neuropathic pain → gabapentin, pregabalin
- Pain from a tumor that is infiltrating nerves or compressing the spinal cord → STEROIDS (ie, Pancoast tumor that is beginning to infiltrate the brachial plexus)
- SOB (dyspnea) associated with cancer → DOC opioids (especially morphine).
    - Normally opioids depress respiration → oxygen consumption ↓, so if your short of breath it means you're gasping for oxygen, so with opioids you decrease the person "need for oxygen", so they won't be gasping as much
    - Opioids dilate pulmonary vessels and can ↑ oxygen delivery in the body

  - When a person is hypoxic, the body response is to hyperventilate, CO2 begins to build up or they become hypoxic (O2 goes down), opioids “numb” that response, they make you hyporesponsive to hypoxia or hypercapnia.
- Patient with lung cancer that is obstructing the airway (ie, bronchus), if they asking for ways to treat their dyspnea → Stent this patient airway (insert a stent to widen the airway so they can breath better)
- Patient with mesothelioma that is producing a massive pleural effusion → THORACENTESIS (to consistently drain it)
- Patient with pancreatic cancer and is obstructing the pancreatic duct producing severe pain → Stent the pancreatic duct, it helps with the pain, the itching. it does not change their prognosis/survival but it does improve the QUALITY of life!
- Nausea (especially if due to chemotherapy): the DOC is ONDANSETRON (serotonin receptor antagonist); alternatives metoclopramide (dopamine receptor antagonist - very good prokinetic agent; be careful with EPS!) & Aprepitant (antagonist of neurokinin-1 receptors - very powerful antiemetic in palliative care). [**OMA**]
  - If they give a scenario of a patient who is receiving tx for nausea induced by chemo and now they have leukocytosis, high fever, muscle rigidity → NMS
    - *Dantrolene* is the DOC, is a ryanodine receptor blocker, works like a CCB
    - If they ask what is the most common/adverse renal complication of NMS: rhabdomyolysis (intrarenal AKI → acute tubular necrosis!); remember you’ll see a lot of blood in UA but in urine microscopy, there won’t be a lot of RBCs.
- Patient with nausea due to bowel obstruction from a GI mass → Steroids, because they can ↓ edema which can relieve obstruction
- Cancer patient with a lot of pain, who is on a lot of opioids → constipation
  - Prophylaxis against constipation: give a stimulant laxative like Senna
  - Tx against constipation: give agents that make the stool bulky like methylcellulose, psyllium - remember you need to be taking a lot of fluid for these agents to work; you can also use PEG (not reabsorbable in the GI tract - is an osmotic laxative); lactulose (non-absorbable sugar); methylnaltrexone is a mu receptor antagonist, which reverse the effects of opioids in the GI tract.
- REMEMBER in a patient who has a high-grade bowel obstruction you CAN’T give any of these medications for constipation → you can induce peritonitis! or can produce a bowel perforation!!.
  - You can also use mechanical means: so if it is a small bowel obstruction you use an NGT connected to wall suction; if it is a large bowel obstruction (ie, sigmoid volvulus) you can do a sigmoidoscopy and place a rectal tube and attached it to wall suction.
- Anorexia & cachexia:
  - Patients are losing a lot of skeletal muscle mass and won’t gain weight even if you give them a lot of nutritional support.
  - This is due to: TNF-alpha (proinflammatory CK) and also because when people reach near the end of life they’re having abnormal metabolism of energy products.
  - Tx: progestin analog, like megestrol or medroxyprogesterone, these are very powerful appetite stimulants! If you don’t see them in the answer choice, choose steroids. Also Dronabinol (synthetic cannabinoid)

HOSPICE

- When life expectancy is less than 6 months
- It can be done at home or at a nursing facility

- The goal here is not curative, is to make the person more comfortable at the end of their life. It is to manage their sx.

REMEMBER: you don't give palliative care to a person who is going to die in the near future, you can give it to patients that are being treated with a curative goal. YOU GET PALLIATIVE CARE BECAUSE YOU HAVE A SERIOUS ILLNESS, NOT BECAUSE YOU'RE GOING TO DIE.

Ep 270 [Rapid Review Series 43]

Heatstroke (physical exertion vs non-physical exertion) vs Heat exhaustion

- Vignette: Solder/athlete with AMS and Temp 104 F after **running** in a 100 F day in Arizona/Texas → heatstroke. Treat with **ice water immersion**
- Other causes of heatstroke unrelated to physical exertion: Anticholinergic toxicity (eg, diphenhydramine in OTC cold meds), adrenergic drugs, diuretics. Treat with **evaporative cooling techniques** *(not ice water immersion!!)* - eg, place them under a fan.
- How to tell heatstroke and heat exhaustion apart on NBMEs?
    - Heatstroke has altered mental status (AMS)
- Ice water immersion is absolutely contraindicated in heatstrokes that are caused by anticholinergic toxicity!! (Very HY!!)

Malignant Hyperthermia

- Vignette: Patient paralyzed during a surgical procedure with inhaled anesthetics develops increasing PCO2 (harder to ventilate) + very high fever + leukocytosis
- Malignant hyperthermia is caused by an AD mutation in calcium channels - e.g., ryanodine receptors
- Triggers: Succinylcholine
- Management:
    - Stop drug immediately
    - Give **dantrolene** - ryanodine receptor antagonist or **CCB** (if they wanna trick you) as ryanodine receptor is a calcium channel
    - Manage **hyperkalemia** (the most likely electrolyte abnormality due to release from dead muscle cells)
        - Calcium gluconate
        - Insulin + glucose → to drive K into cells
        - Sodium bicarbonate → creates metabolic alkalosis that draws H+ ions out of cells and K+ into cells
        - Beta-2 agonist (e.g., albuterol) → increases Na-K activity → drives K+ into cells
        - Vigorous fluids + furosemide → increases urination → activates RAAS → increased aldosterone dumps K+ into urine ⇒ K diuresis

        - Sodium polystyrene sulfonate (K binding resin) → increases the risk of bowel necrosis (hence not widely used)
    - Manage **rhabdomyolysis**
        - Urinalysis shows Blood (+++) but no RBCs under microscope hpf - analogous to albuminocytologic dissociation in GBS
        - Fluids (prevention and treatment)

Neuroleptic Malignant Syndrome (NMS) vs Serotonin syndrome (SS)

- Vignette: Diabetic gastroparesis recently started on a drug + currently presents with confusion, altered mental status, muscle rigidity, high BP, tachycardia + no myoclonus and **decreased DTR**
    - Dx: NMS - exposed to drugs that block dopamine receptors
    - This patient most probably took **metoclopramide** (prokinetic agent), a dopamine receptor antagonist
    - Ddx from Malignant Hyperthermia: NMS will have exposure to a dopamine-R blocker; MH will have exposure to anesthetic agents
    - Variant: PD patient who hasn’t taken their carbidopa-levodopa meds for 2 weeks + presents with leukocytosis, muscle rigidity, etc → think NMS
    - Treatment:
        - 1st line: Dantrolene
        - Dopamine agonist
        - Benzodiazepine (last resort)
- Causes of **Serotonin Syndrome**:
    - Drugs: SSRIs, SNRIs, TCAs, MAO-inhibitors, Linezolid (MRSA coverage with weak MAO-inhibitor properties), sumatriptan, St John’s-wort (SSRI), ecstasy MDMA
    - Vignette: Patient switched between diff kinds of serotonergic agent without waiting for 2 weeks in between
    - Management:
        - 1st line: Benzodiazepine - *pick this over cyproheptadine*
        - Cyproheptadine
- SS vs NMS: SS has myoclonus and increased DTR (double positive)

Various Hypertension Treatments

- Vignette: H/o Marfan/Turner syndrome + sudden onset severe chest pain + hypertensive
    - Dx: Aortic dissection
    - First-line management: Beta blocker of any kind (including labetalol). Hydralazine is always the wrong answer, and it worsens morbidity.
- CHF exacerbation + pulmonary edema + HTN
    - Management: Nitroglycerin, nitroprusside (nitrate-based compounds)
        - Works as a venodilator → pulls blood into the legs & away from the lungs where it won’t kill the patient
        - Also decreases myocardial oxygen demand
- Very hypertensive + thick skin + long h/o GERD
    - Dx: Scleroderma renal crisis
    - Management:

        - ACE-inhibitors / ARBs
- Hypertensive emergency + h/o atypical depression started no a new drug + AMS at a restaurant + BP 250/130 mmHg
    - Dx; Tyramine food crisis
    - Patient probably taking MAO-inhibitor → can't metabolize tyramine
    - Management: Phentolamine (drug of choice) ⇒ a reversible non-selective alpha blocker
- Hypertension or hypertensive emergency in pregnancy
    - Management: Labetalol, nicardipine, hydralazine
    - Never give ACE-i or ARBs!!!

Ep. 275 USMLE Nov 2020 Changes Series 5: Diagnostic Errors

Diagnostic error = cannot provide the correct diagnosis at all or in a timely manner

Radiologist reads an image and finds pulmonary embolism => must call the clinician rather than just putting it in your notes. If you don't this is a diagnostic error.

MCC of malpractice claims? Diagnostic error, esp in internal medicine.

Most diagnostic errors are due to cognitive issues. What are some buzzwords for these cognitive errors?
- Premature closure = comes to a diagnosis and **ends workup prematurely**. Example: an alcoholic patient with vomiting and abdo pain. You dx them with AP without running further tests. You may harm the pt if you miss out the real dx because of premature closure.
- Diagnostic momentum = you consider a particular diagnosis earlier on, you work up the patient but although the results do not point to your initial diagnosis, you **keep doing more tests** that could confirm that **initial diagnosis**. Example: patient presents with a pic similar to alcoholic pancreatitis, lipase is normal, you still think pancreatitis and work up further to prove this.
- Confirmation bias = you make a diagnosis but **overlook** evidence that points to another diagnosis. Always consider other diagnoses and document these too!! This bias is present with people with premature closure & diagnostic momentum.
- Faulty application of knowledge = you know how asthma should be treated but you fail to apply it properly somehow.

To prevent diagnostic errors -> have the concept of heuristic in your mind.

Heuristics:
- Availability heuristic = your current diagnostics are affected by previous experiences. Example: alcoholic patient presents with abdominal pain, which is later diagnosed as DKA. As a result, the first thing that comes to mind is DKA rather than alcoholic pancreatitis, which is more common.
- Anchoring heuristic = settling on a diagnosis early, through initial impressions.

- Representativeness heuristic = you've seen alcoholic patients with epigastric pain and you diagnosed them correctly with AP. Seeing this consistent pattern repeatedly leads to making this dx in all patients presenting similarly and not considering other dx. Similar to availability heuristic but anchoring occurs with a specific, memorable event in which you see a classic presentation + rare disease. Representativeness is classic presentation + classic disease. So epigastric pain + DKA vs epigastric pain + AP in an alcoholic presenting with epigastric pain.

Other ways to reduce diagnostic errors on NBME exams?

- Diagnostic time out -> take a timeout to re-consider the diagnosis every now and then. It allows a fresh set of eyes. Especially if the patient is not responding very well to tx.
- Always admit your mistakes!
- Worst case scenario medicine also helps.
    - Used a lot in emergency medicine. Consider the worst diagnosis first, this allows you to safeguard against missing the most life threatening diagnoses & documents that you considered.
    - Does not mean that you have to test but at least consider & document why you considered & why you didn't pursue further testing.
- Being systematic in approaching common problems & having thorough checklists also reduces errors and missing out.
- Ask why! What may have caused this patient's problem? Pathophys based thinking.
    - Smoker comes with increasing cough and dyspnea => dx with COPD exacerbation. But still ask what caused the exacerbation!
    - This also helps with lowering cost of healthcare -> more tests ordered if not thinking about causes
- Employ Bayes theorem -> good clinical decision making.
    - Whenever you are ordering a test -> always ask if pt is low-interm-high risk for this problem.
    - Ask about pretest & posttest probability for the patient.
    - Example: fit, athletic, young patient with SOB and chest pain. Pretest probability of having PE for this patient is LOW -> so D-dimer test over CTPA.
        - Vs 37 yo female, smoker, OCPs, just flew in from somewhere distant -> high risk for PE -> CTPA. D-dimer being negative will not rule out PE in this patient because she is not at the same level of risk as the athlete.
    - Bayes theorem guides algorithms.
- Ask what features of the presentation may not fit the diagnosis.

Systems based factors that can contribute to diagnostic errors -> pressure of performance.

- Example: high volume and turnover of patients in EMED.
    - Leads to diagnostic errors
    - High volume of tests being ordered -> not high value of care. This increases cost of healthcare

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Ep. 276 USMLE Nov 2020 Changes Series 6: Professionalism/Ethics

4 principles: beneficence (act in best interest), nonmaleficence (no harm), autonomy, justice (equitable regardless of SES and access to care)

Patient makes a choice, must respect that choice!! Informed consent allows this. Informed consent = Risks + benefits of treatment, alternatives, etc

Patient with covid 19, PPE is available. Can a physician refuse to give care because they are worried about contracting the disease? No because there is PPE!! But if there was no PPE, physician can ethically refuse providing care. You can implement this to the context of HIV, hep B, hep C, MDR organisms like tb. As long as you are taking appropriate measures, ethically bound to take care of these patients.

Close family member/friend needs care, can you take care of them? No! Because you may not be impartial.

Sexual relations with a current patient? Absolutely not!! If you really want to, the appropriate thing will be to talk to a colleague + break the therapeutic relationship first + wait for 6 mo. (But never ever if you are a psychiatrist!! - addition from Conrad.) Having sexual relationships with relatives/cousins of a current patient is inappropriate.

Patient comes in for a disability evaluation and patient is trying to coach you on how to fill in the disability claim forms. Just do whatever is medically appropriate, never assist a patient in getting fraudulent disability benefits. Legally culpable if you do so.

Patient is from another country, 89 yo F with terminal cancer. Family members ask you not to disclose the dx to the grandma. First line response? Ask the patient how much they want to know!! Then, do as they say. Most right answers encourage more convo between patient and physician. If patient wants only the family to know and not themselves, this is known as authorized delegation.

Difficult patient, quarrels with you, is not compliant - can you sever your relatioship with these patients?

- If serious illness or not medically stable = cannot sever relationship!! Patient has to be medically stable to sever relationship.
    - Severing a relationship when pt is medically unstable = physician abandonment
- Patient is medically stable and things are not working out, best answer = try to repair the relationship.
    - If nothing has worked out, to end the relationship = ending relationship should be mutual + give written notice 60 days in advance + provide info on other physicians who may take care of pt
    - Eventually, before transferring their medical records to the other physician MUST GET APPROVAL FROM THE PATIENT!!

You are a resident and you notice an attending is impaired. There is clear evidence of impairment and they are trying to take care of pts. First step? Immediately remove from patient care. If they are doing a surgery, remove from surgery. Then, report to appropriate authority. Chief of division -> head of department -> medical board. Note: but never report heresy. Only report smt that you yourself observed.

If you make an error as a physician, always disclose. You give too much insulin but patient's glucose is ok. Next steps?

1. Disclose the error to patient
2. Apologize for the error
3. Tell what you plan to do to prevent similar errors in the future

Even if no harm occurs, must disclose errors.

Patient came to see a physician, gets blood tests. But the patient does not pay and still requests their results. NBS? Must tell the pt their results!! They have full rights to own info regardless of payment.

Patient confidentiality, when can it be violated?

- Transmissible disease (e.g. hep B) + HCW, food prep industry -> must disclose to employer
- Bad communicable illness (tb, meningitis) but patient wants to leave and keep working -> hold pt against will if need be until not infectious!
- STI (e.g. HIV, trich) -> first pick the choice that encourages pt to tell the partner. Even if pt says they will inform the partner you need objective evidence. Regardless of what the pt says, also let the health department know. They will reach out to close contacts of the patient.
- Person has severe arrhythmias, uncontrolled seizures -> report this to DMV, you would be legally culpable if this patient drove and got involved in an MVC
- Person < 18 -> most times have to disclose health info to parents even if the child doesn't want. On the flipside, if parents don't want the dx to be disclosed to child, NBS? Encourage the parents to tell the child or ask the child what have you parents said. So, gathering info is the answer! But you cant tell the dx to the child.
- Person < 18 + health issue concerns sexual health, substance abuse, mental health -> do not disclose to parents if child does not want them to know!!

Do not refer patients to facilities where you have some kind of financial interest in!! Or do not pay another physician to refer patients to you.

As a physician, you do not accept gifts from insurance companies or pharma companies to recommend a specific product.

Physicians selling stuff in their office = unethical! Cannot sell cosmetics or herbal products as a physician because these are not medically proven. Living in a rural area + selling health equipment that patients may need but can't find in that area.

Physicians cannot become the face of a non medically approved product, eg a supplement not approved by FDA or has evidence.

Perfectly fine for a physician to be an expert witness in a legal case!! But should not accept money to become a witness.

Research study for super expensive drugs, you cannot deny access to this study based on SES!

Patient has a living will you have to follow the living will! Not the family's orders. Living will will always hold up. What if the patient does not have a living will? Next step: gather more info about the patient's wishes from the family members, do not directly acquiesce to what family members say.

Patient has something that will kill them like PE, but the patient wants to go home and they are completely lucid. NBS? In real life leaving against medical advice form. Then they can go home. We can override this only when they are a danger to others, like communicable illness or they will drive but it will not be safe.

Patient is on a ventilator, they are lucid and wants the ventilator removed. Do not pick the answer choice that involves boom you pull the plug. Try to gather more info like why do you want to do this? Talk to family, etc. if pt is persistent after all this then you can pull it.

Patient diagnosed with a really bad genetic disease but refuses to tell wife. NBS? Encourage them to tell the spouse. If they still refuse it, tell them because if they have a child with them the baby will be at risk.

Ep. 277 USMLE Nov 2020 Changes Series 7: Infection Prevention and Control

   a. Droplet
      i. Gown+glove+regular surgical mask
   b. Airborne
      i. Gown+ glove+ RESPIRATOR/N95 mask
   c. Contact
      i. Gown + glove

2. Will tell you about a C diff outbreak in an ICU. What measure would have prevented this?
   a. Handwashing - Can't use hand sanitizer
   b. C diff pts need to be in CONTACT isolation means you can get it by TOUCHING A SURFACE
   c. Need to wear gown & gloves when taking care of pt (but NO MASK needed)
      i. Others that have contact isolation
         1. HUS – from EHEC or Shigella

3. COVID 19 pts = under AIRBORNE precautions
   a. GOWN+GLOVES+ RESPIRATOR/N95 mask
   b. Patient also needs to be wearing mask BUT it can be ANY KIND OF MASK
   c. Also- SARS, Smallpox, TB
   d. N95 b/c filters out 95% of particles
      i. N100 -filter out 99% of particles

4. TB
   a. When available□ need to be in negative pressure room

5. Pt on ventilator b/c they have ARDS. What can you do to improve survival?
   a. If on ventilator□ most likely in ICU
   b. Do lung protective strategies
      i. LOW tidal volumes

        ii. HIGH PEEP
    c. Need to be place PRONE position (not supine) – belly down

6. Droplet Precautions
    a. N. meningitis, Pertussis (Whooping Cough), Influenza
    b. Also Walking pneumonias-eg. Mycoplasma, Legionella

7. If pt has some plastic in bodies (catheter/IV line/central line/etc), the moment they can be without it:
    a. TAKE IT OUT

8. When should you wean a person off a ventilator?
    a. If pt has very good oxygen saturation (good O2 tension)- FiO2 30-35 %or less and they're using VERY LOW PEEP (< 5)

9. Central lines (Central Venous Catheter)
    a. You have to clean surrounding skin with CHLORHEXADINE
    b. When putting it in□ you need to be completely sterile- need to drape you AND pt
        i. Surgical mask, cap, gown, STERILE gloves
    c. Always try to AVOID a femoral central line□ VERY HIGH risk of infection or CLABSI
        i. Go for jugular or subclavian
    d. Give TPN through central line
        i. Most likely complication pt will have from getting TPN= central line assoc blood stream infxn (CLABSI)
            1. Way higher chance of getting CLABSI than acalculous cholecystitis

10. Pre-op ABX prophylaxis
    a. 30-60 min before surgery
    b. Cefazolin (ANCEF)

11. Needlestick injury
    a. Clean off wound as much as possible
    b. Start PEP as quickly as possible
    c. Test needed after PEP treatment to make sure person never develops infection
    d. HEP B
        i. Pt is HepB positive and you (healthcare worker) are HbsAb positive (hepB immune via vaccine)
            1. NBS□ do NOTHING
        ii. Pt is HepB positive and you (HCW) are not immune
            1. You get PEP□ HepB vaccine + HepB Ig- but give in separate arms (so Ig does not bind up the vaccine)
    e. HepC
        i. Don't worry about this for NBME exams
    f. HIV
        i. PEP= tenofovir +imcitrabine + raltegravir for 4-6 weeks to prevent from seroconverting and getting HIV

    g. Pt has all the diseases. If HCW gets needlestick injury, which does he have greatest risk of seroconverting to which disease?
        i. HEP B (have 25% chance of getting it if not immune) – 1 in 3 chance
            1. Hep C- 1 in 30 chance
            2. HIV risk is very low- 1 in 300 chance

12. What are some healthcare systems and preventions that you can improve to prevent needlestick injuries?
    a. Use PPE (glove/gown/mask/etc)
    b. Put needles in Sharps containers as soon as done
    c. Safe needles (blunt tips/capped/syringes over them)

13. What's the most effective ways in reducing transmission of HEPB in HCW?
    a. HCW getting hepB vaccine

Ep. 325 Extremely HY Screening Guidelines

In pregnancy

First Appointment Screening

Gestational Diabetes

- Start screening at 24 weeks with 1 hour glucose test and
    a. If positive follow with 3-hour glucose tolerance test

HIV

- At first prenatal visit
- Retest for HIV in the Third Trimester.

HBV

- At first prenatal visit
    - Hep B Surface Antigen.

Syphilis

- At first visit

Asymptomatic bacteria: Increase risk of preterm labor and delivery. (Nonpregnant asymptomatic not treated)

- Treated with nitrofurantoin o or 1st/2nd gen cephalosporin
- Test of cure

Group B STREP

35-37 weeks anal and vaginal

Women's RH status and antibody status (BY INDIRECT COOMBS TEST)

- Rhogam at 28 weeks and second dose within 3 days postpartum

Smokers

- **Screen for AAA (Abdominal aortic aneurysm)**
    - Between ages 65-75
    - Only men!!!
    - If you have smoked as a male or have a family history of AAA
    - With an ultrasound

  - If more than 5.5 cm you need intervention (endovascular repair of some sort)
- **Screen for Osteoporosis**
  - Screen in woman
  - Normally you start screening with DEXA scan at age 65 for general population.
  - But in smokers you can start screening for osteoporosis at younger age
  - You can also screen for osteoporosis at less than 65 if:
    - Very thin like with Anorexia Nervosa
    - Premature ovarian failure
- **Lung Cancer**
  - **You need to be between ages 50-80**
  - **Have a 20 or more pack-year history**
  - **Currently smoking or have quit less than 15 years ago.**
  - **Screen with a low dose CT scan and you only do it 3 times every year**
    - **If you screen 3 times year after year and it is negative you can stop**

Special Genetic Diseases

Familial Hypercholesterolemia

- People get MI at age 25
- People have LDL receptor mutation generally
- Remember rule of 3
  - Start checking LDL cholesterol at age of 3, 9 and 18
  - You will continue to screen but not tested on NBME

Inflammatory Bowel Disease (Both of them)

- You start screening for colon cancer 8 years after making initial diagnosis.
  - Continue screening every 1-3 years after that
- You have a small exception of rule:
  - If they are diagnosed with **primary sclerosing cholangitis** they need to be screened for colon cancer ***at the time of diagnosis***.
    - Then you continue screening every 1-2 years

Lynch Syndrome

Px tend to have microsatellite instability problems

- Start **colon cancer** screening at age of 20
  - Continue every 1-2 years
  - Make sure you go straight to COLONOSCOPY
  - You can give aspirin as a prophylaxis!!!
- They have other cancers as well
  - Start screening endometrial cancer at age 30
    - Continue every 1-2 years
    - Endometrial biopsy or sampling

      - § You offer a prophylactic (THBSO) **total hysterectomy with bilateral salpingo-oophorectomy** after child bearing due to astronomic risk of endometrial cancer and ovarian cancer

Patients with MEN 2A or 2B

- Its not a matter of if but when will you get a medullary thyroid cancer
- You offer a prophylactic thyroidectomy !!!

Familial Adenomatous Polyposis

APC gene mutation-> Polyps -> Kras mutation-> p53 mutation-> Adenocarcinoma

- Start colon cancer screening at age 10 years
- Continue every year

BRCA Mutations

Breast cancer screening guidelines

- Between ages 25-29 you deserve an annual breast mammogram
- If you are over the age of 30 you deserve
  - Annual breast MRI and annual mammography

Risky Sexual Group

- Individuals with HIV
- Men that have sex with men
- Sex workers
- IV drug users

Screening guidelines

- If you are between ages 15-64
- You deserve annual HIV
- Screen for syphilis every three months
- Screen for Chlamydia and gonorrhea
  - You only screen women, DO NOT SCREEN MEN!
  - You screen higher risk patients annually no matter the age
  - ALL patients (not only high risk) younger than 24 need annual testing
  - Non risky patients don’t need to be screened for these two annually after age of 24
- Screen for Hep B surface antigen every year
  - Also screen the antivaxxers every year for hep b

Metabolic Diseases

Hypertension

- Screening is started at age 18 through 40 every 3-5 years
- After age 40 you screen every 1-2 years
  - Prevalence and incidence increases dramatically over age 40
  - Guideline will change due to increase of burden of cardiovascular disease

Diabetes

- Obese individuals between age 40-70 years old
  - Screen every 6 months
  - Fasting blood glucose
  - Oral glucose tolerance test
  - HbA1c
- Hypertension over 135/80 and over age 45
  - Needs screening every 6 months!!!!

Osteoporosis

- Screening at age 65
- We only screen Women
- DEXA scan looking at t score
  - -2.5 or less
  - Needs treatment

Hyperlipidemia

There are three screening guidelines separated into groups:

Everyone gets initial screening at age 20

For metabolic disease the screening guidelines gets more frequent the older you become.

- Men
  - Ages 20-45: Every 5 years
  - Ages 45-65: Every 1 to 2 years
  - Over age 65: Every single year
- Women
  - Risk increases more after menopause
  - Ages 20-55 every 5 years
  - Ages 55-65: Every 1-2 years
  - Older than 65: Every years
- Diabetics
  - You screen every year, the end!
  - If LDL is 70mg/dl or higher they will be placed on a high intensity statin like rosuvostatin or atorvastatin.

Cancer Screening

Colon Cancer

- Start screening at age 50
- Age 45 or 75 or higher might need colon cancer screening
  - Screening has been started at an earlier age now so lets say its age 45 to 75.
- Many ways to screen:
  - Colonoscopy every 10 years
  - Flexible sigmoidoscopy every 5 years
  - Flexible sigmoidoscopy every 10 years if you do a Fecal immune test **every year**

    - Fecal Immunotest or fecal occult blood test every year.
    - CT colonography every 5 years will start to be implemented.
        - CT scan that has certain protocols that make it highly sensitive for detecting colon cancer.
- If any of the tests other than colonoscopy show an alteration, the next best step is to DO A COLONOSCOPY WITH BIOPSY!!!

Breast Cancer

The problem is NBME uses ACS so know both of them, the question stem will probably give you enough information to know both of them

American Cancer Society

- Mammogram Start at age 40 and then do it every year

USPSTF guidelines

- Mammogram: Ages 50-75 then every 2 years

Cervical Cancer

- Screen ages 21-29 with pap smear every three years
- If you are 30 to 65 years old
    - Preferred modality: Pap smear + HPV contesting every 5 years
    - Pap smears every three years
    - HPV testing every 5 years
- Special Cervical Screening guidelines
    - HIV or immunodeficiencies:
        - They get pap smears every year!!!
        - Especially T cell deficiencies like DiGeorge
- Hysterectomy and pap smears:
    - If it was done do to benign conditions like leiomyomas: You do NOT NEED TO DUE A PAP!
    - If it was done due to malignant reason (cervical or endometrial cancer): Pap smear of the vaginal cuff.
    - If hysterectomy was done due to cervical cancer you will continue doing pap smears until 20 years after the surgery
- Stop screening at 65:
    - No history of cervical cancer
    - No history or severe Pap smear HSIL OR CIN 3
        - If they did then you need to have 3 negatives in a row
        - Or 2 pap smears plus HPV contesting in a row

Children

Patients with Language difficulties:

- Screening hearing with audiometry

All kids between ages 3-5 years old

- Screen for amblyopia-> Lazy eye

Miscellaneous

Women Less than 24 years old: Screen annually for gonorrhea and chlamydia ONLY IN women

Who needs to be screened for Hep B?

Need to be screened every year

- Patients who receive multiple blood transfusions or are constantly on dialysis
- Long term chemotherapy or long-term immunosuppressive therapy due to transplant.
- With hepatitis b surface antigen

All people between ages Hep C 18-79 once

Screening for depression

- Easy questionnaire:
  - PHQ-9
  - Beck depression inventory

ALL FURTHER EPISODES WILL BE IN THE SMALLER DOCUMENTS